

CIO

FIRST OF TWO SECTIONS
MAY 1, 1999

THE MAGAZINE FOR INFORMATION EXECUTIVES

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CIO Enterprise Value Awards

Application Due:
June 15, 1999

Winners Notified:
October 1999

Awards Ceremony:
Jan. 30-Feb. 2, 2000
*at the CIO Enterprise Value
Retreat, Westin La Paloma,
Tucson, Arizona*

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CTO

THE MAGAZINE FOR INFORMATION EXECUTIVES

MAY 1, 1999

SECTION ONE

164 PAGES IN TWO SECTIONS

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The Hidden Costs of Data Integration

Seven Ways
To Protect PAGE 38
Your Investment

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IT Builds Its
Dream House

PAGE 46

Y2Chaos Theory

PAGE 68

Timberland's Yusef Akyuz
says costs skyrocket
when CIOs fail to see
the forest for the trees

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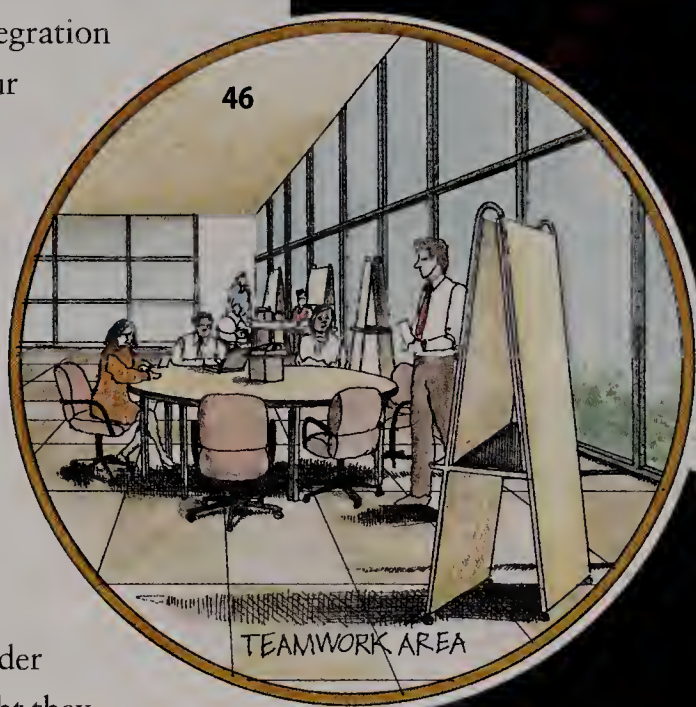
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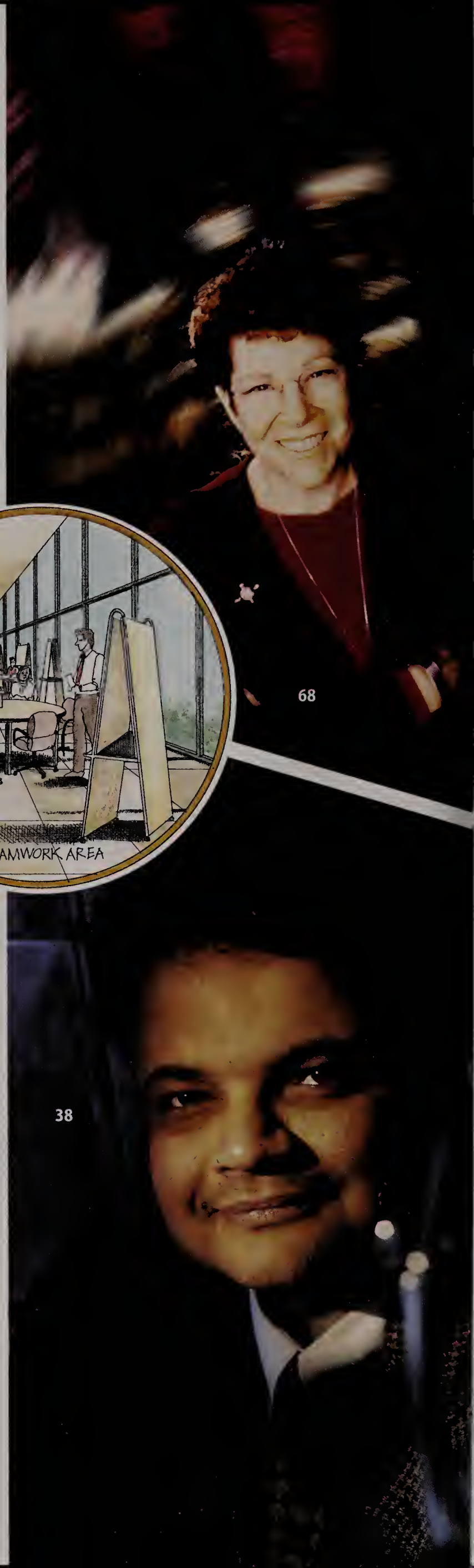
By David Pearson



ON THE COVER

Yusef Akyuz, **Timberland**
VP of IS, has some **tips** for you on
surviving data integration.

Cover photo by George Simian



Are You Open To A New Point Of View?

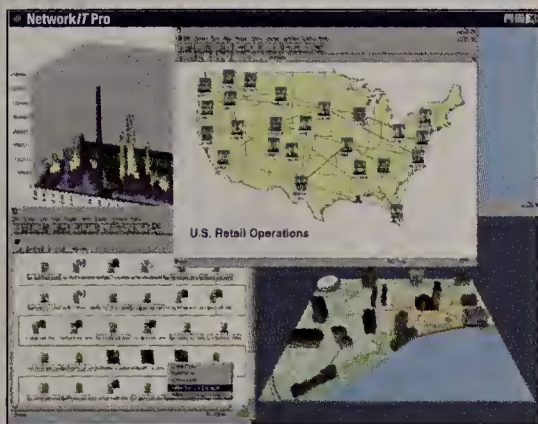
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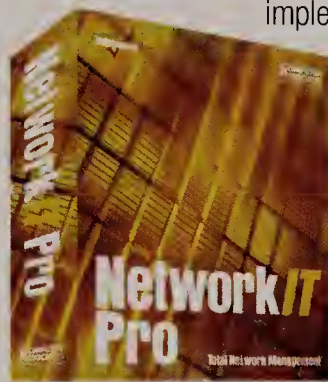
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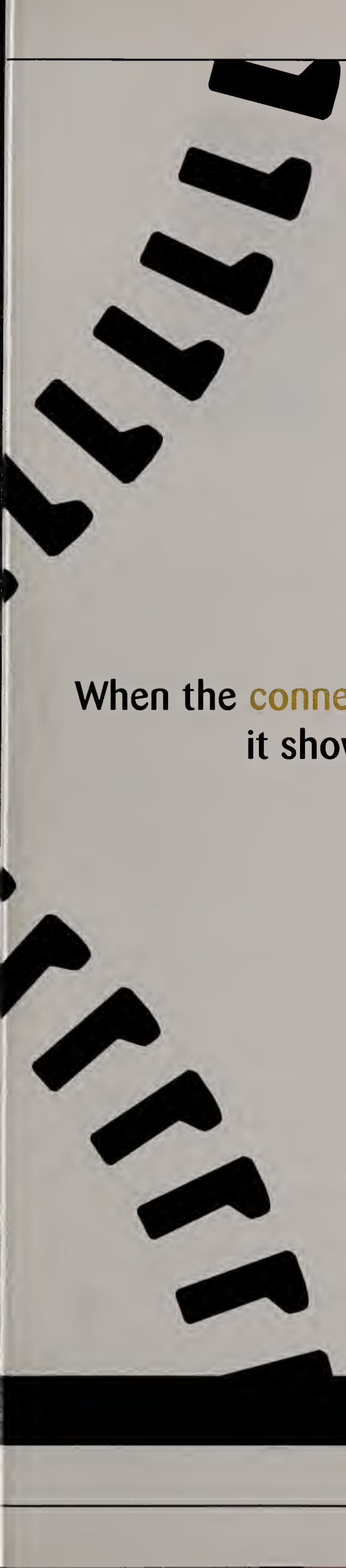


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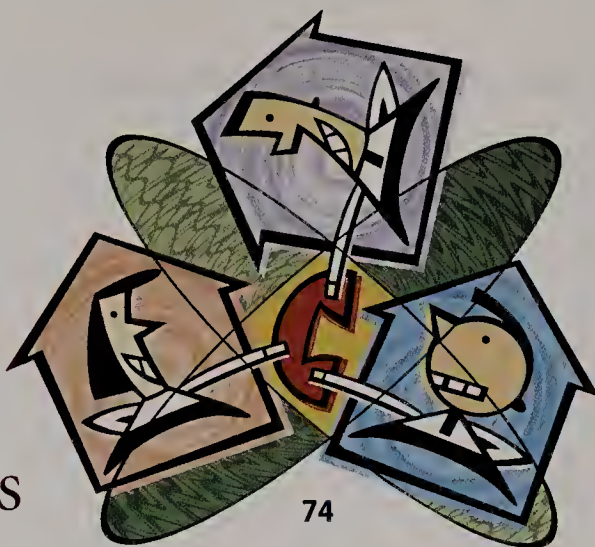


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When the NYSE looks enviously at Nasdaq, it sees an \$80 million network that is hard to beat. And easy to join.

OUTSOURCING Thanks to the Web, CIOs now can rent enterprise applications instead of buying them.

NEW BUSINESS Do-or-die lessons from a look back at netrepreneurs who just did it.

NETREPRENEURS Firstuse.com hopes to stop intellectual property thieves in their tracks.

THE MAIN ATTRACTION A new generation of intelligent agents could transform the online shopping experience.

BY DESIGN Office Depot clears the aisles.

GRAY MATTERS As political deal making moves from back rooms to chat rooms, the public tries to log in.

POWER SOURCE You can access the Web from your Palm computer, but micro-browsers are a work in progress.

BACK TALK Don Tapscott: The Opportunity Gap



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“

SQL Server takes a big step toward enterprise capability and introduces dramatic ease-of-use improvements with version 7.0 of the database server.” – *PC Week*¹

“New features extend SQL Server’s performance and scalability...most of the changes will move SQL Server from the role of department server **into the role of enterprise database server.”** – *Windows NT*²

“SQL Server 7.0 boasts impressive features

that administrators and users will both appreciate.” – *InfoWorld*³

“SQL Server 7.0 provides the flexibility, relational power, and continued ease of use that should put the product in the corporate winner’s circle.” – *Intelligent Enterprise*⁴

“We recommend that you consider SQL Server 7.0 for new data warehousing projects ranging from departmental and line-of-business

data warehousing even to the enterprise,

especially if you’re already a [Windows] NT shop.” – *Mitch Kramer, Patricia Seybold Group*

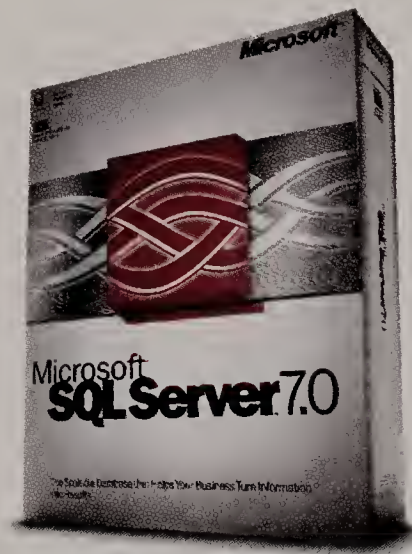
PC Week Best of Show, *COMDEX/Fall 1998*

**Database and Server Software
1998 Product of the Year** – *InfoWorld*⁵

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In Box

LETTER FROM THE EDITOR, READER FEEDBACK
AND HOW TO REACH US

One of the holy grails of the CIO's world is the ability to provide every business user access to a single set of accurate corporate data across the enterprise. It sounds so simple, yet it's one of the most difficult and costly things to achieve in business today.

In the early '90s, brilliant technologists devised complex interfaces to connect the systems deemed critical to the organization's success. This created a tangle of technology that was nearly impossible to manage.

In the mid- and late 1990s, CEOs said they had had enough and spent millions to rip out all that complexity in favor of what seemed like a logical answer: enterprise solutions from vendors like SAP AG. Unfortunately, even the biggest of the big systems still don't do it all. Once again, CIOs find themselves wrestling with how to make their systems communicate with other applications (see "The Ties That Bolt," CIO Section 1, April 15, 1999).

The latest entrant to this data game is message-brokering middleware, which lets companies retain their legacy systems while

doing whatever they want with the front end(s). Data goes to a central spot, where it gets translated to the format of the requesting application. The user's none the wiser; it all happens behind the scenes. And the technologists have a focal point for their integration efforts.

However one goes about integrating data, it's still a bloody nightmare to manage, and the costs are ghastly. Even the best solutions have traps and hidden costs. So before you set out on that integration project—and especially before you tell the CEO the price tag—read Senior Writer David Pearson's "The Hidden Costs of Data Integration," beginning on Page 38.

Systems complexity is not the only form of chaos CIOs worry about these days. In "Y2KChaos," beginning on Page 68, Pearson interviews organizational theorist Margaret Wheatley to learn why the science of complexity, or chaos theory, is the most effective approach to Y2K contingency planning.

In this issue, we also conclude our Great Expectations series, which has followed the fortunes of three CIOs during the past two years. In this final installment (beginning on Page 60), Senior Editor Tom Field focuses on Levi Strauss & Co.'s Linda Glick, who has been wrestling with new ways to interact with and deliver products to customers in the face of the company's alarming downturn in sales. Managing the customer experience is high on everyone's lists these days, but Levi Strauss provides a cautionary tale: The most creative customer experience in the world won't help you sell more products if the products aren't what the customer wants. Perhaps it's time for Glick and her business and marketing peers to turn their attention back to doing more upfront information gathering and analysis, particularly from their younger customers.



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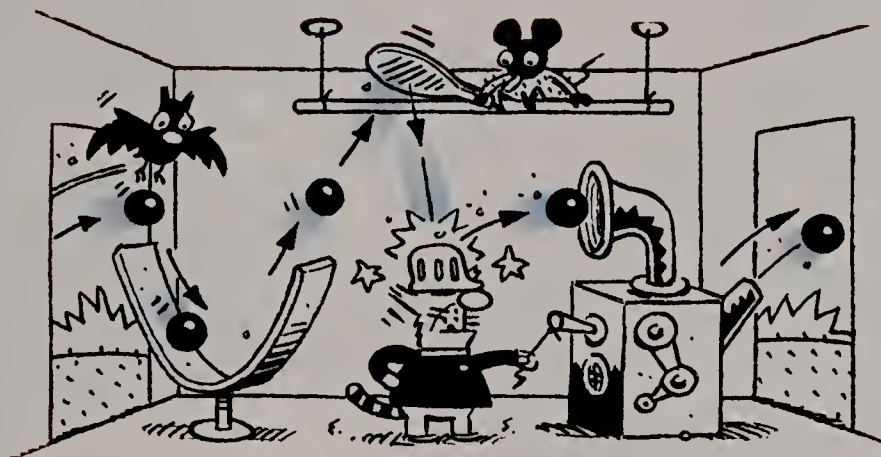
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In Box

COMPANY TIME

Good piece in the March 1 issue ["Guiltless Pleasures?" CIO Section 2]. Perhaps the counterpoint is that the Web has also become an extension of work on weekends and evenings. Research that was possible only during business hours (for the most part) is now being done after-hours. I wonder what work goes hand in hand with this. Perhaps this time more than makes up for the book ordering and general yahooing around the Net during the day.

Steven Morgan

*Vice President of Sales & Marketing
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LINUX VS. WINDOWS

While you make some valid points about the current state of play with respect to Linux [Publisher's Note, CIO Section 1, March 15, 1999], I take exception to part of your closing statement: "CIOs, not the sneaker-wearing programmers, will determine the fate of Linux. Its vocal supporters deserve credit for getting software and hardware vendors to port to Linux. That's the easy part."

I realize that you are writing in a magazine aimed at CIOs, but surely this is rather blatant pandering and ego-

stroking. It's these sorts of attitudes that lead to high staff turnover where CIOs refuse to pay decent salaries to technical staff because they're only techies. Also, I can't believe anyone would consider creating a complete operating system from scratch easy.

As to whether Linux can or will supplant Windows, it really doesn't matter to the people currently driving the open source movement, and frankly I doubt it ever will. What it is about is creating software that does what individual people want. Microsoft will not and in fact cannot provide this. It is impossible for a company, no matter how huge, to provide custom versions of programs to each user. Most users just want the basics, but for those with the need or desire and the talent (something sadly lacking in many of the critics of open source systems) there is no contest. Open source wins by a knockout six seconds into round one.

Matthew Diesch

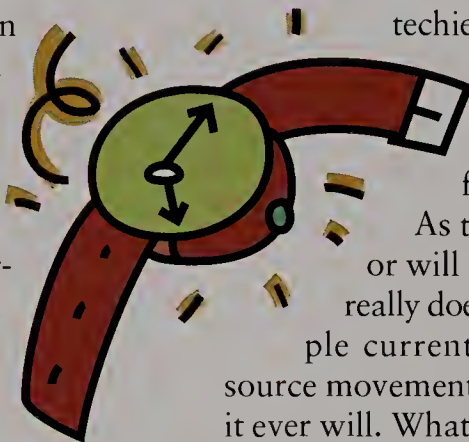
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I am not currently a Linux user and if Microsoft products were better I would have little interest in Linux. But the reality is that Microsoft products are so unreliable, I am desperately trying to figure out how to get rid of them. Because of one mission-critical application that runs only under Windows, the pain and cost of making Linux work in our organization is currently higher than the pain and cost of living a little longer with Microsoft, but the battle between the two is getting closer and closer.

In short, I don't feel so much attracted to Linux as violently shoved toward it by Microsoft. Linus Torvalds may have created Linux, but Microsoft is selling it.

John Gilman

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AWARDSSM

CRITERIA

The Enterprise Value Awards honor technology-enabled business achievement. Winners will be chosen by a panel of independent judges from among entrants who have submitted completed application forms to *CIO* by June 15, 1999.

Entries will be judged on the value of the business achievement resulting from their technology investment. Judges will consider such aspects as the strategic impact of the technology-enabled solution; the degree to which the system has benefited customers or employees; the financial return from the initiative; and the operational or technical excellence demonstrated. They are looking for initiatives that have had a broad and significant impact on the enterprise as a whole.

DEFINING VALUE

We invite applicants to consider the broadest possible spectrum of enterprise value. The following list of IT-enabled benefits is not inclusive but rather is intended to help guide applicants' thinking:

Strategic Impact

- ▶ Penetration of new markets
- ▶ Transformation of the terms of competition within the market
- ▶ Increased market share

Customer Impact

- ▶ Customers have more choices of products and services
- ▶ Customers receive better products and services at lower cost
- ▶ Transaction process is more rewarding/less time-consuming

Financial Impact

- ▶ Lower costs due to streamlined operations
- ▶ Increased profits
- ▶ Increased operational effectiveness

Operational Impact

- ▶ Changes to the industry value chain that are leveraged by your business
- ▶ System enabled redesign of core business processes
- ▶ Cross-functional systems integration led to increased margins

SELECTION PROCESS

Finalists are selected by a screening panel of *CIO* editors and independent consultants (the *CIO* Magazine Enterprise Value Awards process team). Each finalist will be subject to an in-depth analysis of the nominated system, to be performed by *CIO* or its agents. This analysis, which may require a site visit, will be based on interviews with sponsoring executives and system users and will be designed to substantiate all claimed benefits. Site visits will take place in July and August. This team will present its findings to a blue-ribbon judging panel of leading IT practitioners for final judging in October 1999.

IMPORTANT DATES

Deadline: Applications must be received by June 15, 1999

Notification: Winners will be notified in October 1999

Presentation: Awards ceremony takes place in early February at the *CIO* Enterprise Value Retreat. Winners will be profiled in the Feb. 1, 2000, issue of *CIO* Magazine.

ENTRY GUIDELINES

The system must have been operational prior to July 1, 1997 (yes, we really mean '97!).

- ▶ Entrants must agree to be featured, along with their systems and organizations, in a *CIO* article.
- ▶ Entries must be complete (see checklist at end of application).
- ▶ Entries must be on 8.5-by-11-inch paper, one side per sheet.
- ▶ All entries must be computer-generated or typed; no handwritten entries will be accepted.
- ▶ An additional copy of the entry should be sent on a 3.5-inch disk in a format compatible with Microsoft Word and Microsoft Excel.
- ▶ The application form may be reproduced.
- ▶ Only one entry per company will be considered.
- ▶ Entries must be made jointly by the *CIO*/IS executive sponsor AND by the business sponsor for whom the system delivers value.
- ▶ IT vendors, public relations and advertising companies, consultants and other third parties may NOT apply on behalf of another company. They are encouraged to forward this form to the "owner" of the system or to contact *CIO* Communications to recommend that an application form be sent to the client.

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of Business Success

In February 2000, *CIO Magazine* and AT&T Solutions will host a special awards ceremony honoring the CIO Enterprise Value Award winners at the annual CIO Enterprise Value Retreat.

For more information, visit our Web site at www.cio.com/eva or contact Lisa Kerber at (508) 935-4449 or via e-mail at kerber@cio.com.

CIO Enterprise Value Awards

T I M E L I N E

Applications Due:

June 15, 1999

Winners Notified:

October 1999

Awards Ceremony:

Jan. 30-Feb. 2, 2000
at the CIO Enterprise Value
Retreat, Westin La Paloma,
Tucson, Arizona

1 COMPANY/BUSINESS UNIT

Name of parent company

City, state where headquarters are located

Publicly or privately held?

Annual revenues

Industry

Name of business unit or organization

City, state where located

Number of employees at business unit

URL

2 ENTRANTS

A. Name of entering IS executive/system sponsor

Title

Name of division, department or unit

Address

City

State Zip

() ()

Telephone Fax

E-mail

B. Name of entering business-unit executive/sponsor

Title

Name of division, department or unit

Address

City

State Zip

() ()

Telephone Fax

E-mail

3 SUPPORTERS

Please list four people who are willing to be interviewed with regard to the system, its development, its use and the value returned. At least one should be a member of the technology team that developed the system and should have played a significant role. At least one should be a primary user from the sponsoring business unit. The other two may be from either organization or may represent suppliers, customers or others intimately familiar with the system.

A. Name

Title

() ()

Telephone Fax

E-mail

Reason for inclusion

B. Name

Title

() ()

Telephone Fax

E-mail

Reason for inclusion

C. Name

Title

() ()

Telephone Fax

E-mail

Reason for inclusion

D. Name

Title

() ()

Telephone Fax

E-mail

Reason for inclusion

DEADLINE: JUNE 15, 1999

Mail to: CIO Enterprise Value Awards • c/o Lisa Kerber • CIO Communications Inc.

492 Old Connecticut Path • P.O. Box 9208 • Framingham, MA 01701-9208

Visit our Web site at www.cio.com/eva

For more-detailed information on the type of data the judges would like to see, including a model application, please visit our Web site at www.cio.com/eva.

4 THE NOMINATED ORGANIZATION

Please include your most recent annual report or 10k; a corporate brochure; and any other relevant material that will help describe your company and its standing within its industry.

5 THE NOMINATED SYSTEM

Tell us about the nominated system and demonstrate its importance to the organization by completing the following sections. Please limit your material to one or two pages.

System Description: In one sentence or less, describe the system or IT initiative you are nominating (e.g., order-entry or sales-automation system; global intranet).

Date Deployed: Please indicate when the system was fully rolled out. If all users were not online by **July 1, 1997**, please detail what went live when.

Technical Profile: Briefly describe the technology of the nominated system, including its architecture; hardware, software and development tools used; and networking/communications hardware, software and services. Please include the names of all major vendors and products.

Technical Excellence: Describe the degree of overall technical innovation of the solution (does it employ cutting-edge technology?) and its uniqueness within your industry (is this an industry first or second, or is this a common solution?). Please be as specific as possible and include supporting data.

6 BUSINESS VALUE

This is the most important part of the application!

Describe the primary business objectives of and value derived from the IT investment.

List and prioritize the three (3) most important contributions the system has made to the business. Make sure to describe not only what the value is but how it was achieved. Include details and supporting data whenever possible. Please limit this section to a maximum of three pages.

7 FINANCIAL RETURN

Provide a detailed, one-page summary of the nominated system's investment costs (including all up-front development expenses and annual maintenance charges). Also provide details of the financial returns (including increased profits, reduced costs and indirect cost-avoidance). Be specific about where the money is going/coming from, and distinguish between actual and projected costs/returns.

This data is required to make it past the first round of judging. If your company is selected as a finalist, you may be required at that time to fill out a standardized table detailing specific costs and returns. CIO reserves the right to publish relevant costs and returns that establish the claimed financial impact of the system; the willingness to divulge this information for publication is a condition of entry.

8 TRUTH OF INFORMATION RELEASE

The following release must be signed by both nominating executives if the application is to be considered. Unsigned releases will invalidate the entry.

I hereby state that the information provided is true and complete to the best of my knowledge and belief.

I authorize the release and use of, in connection with the CIO Magazine Enterprise Value Awards program, any and all materials furnished by me or others at the company contacted for this judging. I understand that information submitted on this application or subsequently gathered during the evaluation and judging process may be used in articles or any other type of publicity relating to the CIO Magazine Enterprise Value Awards program.

I also authorize the release and use of my name, my company's name and my likeness, including but not limited to any photographs and any recording of my voice or image that may be taken of me for CIO Magazine. I agree that no compensation shall be due me or my company for such usage.

I recognize that failure to meet these conditions or to provide sufficient material that can be published can cause the application to be rejected at any point in the process at the sole discretion of CIO Communications.

1. Signature of nominating IS executive _____ Date _____

2. Signature of nominating business executive _____ Date _____

9 OTHER EDITORIAL OPPORTUNITIES

If you are not selected as an award recipient, are you willing to be contacted for inclusion in other articles in CIO Magazine?

Yes ☐ No ☐

How did you obtain this application form?

- ☐ Saw the ad in CIO Magazine
- ☐ Received a mailing from CIO Communications
- ☐ Came across it on the cio.com Web site
- ☐ A consultant recommended we apply
- ☐ A PR or ad agency
- ☐ An IT vendor/service provider
- ☐ Other (please identify)

CHECKLIST

Have you filled out...?

- ☐ Company/Business-Unit, Entrants and Supporters Information

Have you included?

- ☐ Annual report or 10k and corporate brochure

Have you included on separate pages...?

- ☐ Nominated System (1 page)
- ☐ Business Value (3 pages)
- ☐ Financial Return (1 page)

Have both entrants signed and dated...?

- ☐ Truth of Information/Release

Have you checked off...?

- ☐ Other Editorial Opportunities
- ☐ How you learned about the CIO Enterprise Value Awards program

PREVIOUS WINNERS

1999

Capital One Financial Corp.
The SABRE Group
SBC Communications Inc.
The MITRE Corp.
PPG Industries Inc.

1998

Black & Veatch
New York City Department of Finance
Procter & Gamble
State Street Global Advisors
Tech Data Corp.
U.S. Environmental Protection Agency

1997

Bell Atlantic Corp.
The Chase Manhattan Corp.
Fidelity Investments
MacGregor Medical Association
Schlumberger Ltd.

1996

Brigham & Women's Hospital
Gensym Corp.
McDonnell Douglas Helicopter Systems
Rockwell Space Systems Division (SSD)
Telogy Inc.
United HealthCare Corp.

1995

APCOA Inc.
Commonwealth of Massachusetts
PCs Compleat Inc.
Hyatt Hotels & Resorts
Caterpillar Inc.
Kmart Corp.

1994

SynOptics Communications Inc. (now Bay Networks Inc.)
Complete Health Services Inc.
Los Angeles County Department of Public Social Services
AT&T Universal Card Services Corp.
Chicago Bureau of Parking
South Florida Water Management District

1993

The Perrier Group of America Inc.
New York City Transit Authority
Medical Center of Delaware
Texas Instruments
Lone Star Gas Co.
Travelers Managed Care and Employee Benefits Operations

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HONORING BUSINESS ACHIEVEMENT THROUGH THE INNOVATIVE
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Publisher's Note

This is a column about America's disgrace—and incredible opportunity.

The Institute for Democracy and Electoral Assistance (www.int-idea.se) ranks 170 countries by the average voter turnout in parliamentary and presidential elections. Malta, the tiny island nation off the southern coast of Sicily, ranked first on the list with 96.7 percent voter participation. The United States came in at an abysmal 138th with 44.9 percent of eligible voters going to the polls.

Why are Americans comatose when it comes to the electoral process? Can information technology give this country a democratic wake-up call? I believe it can. The Internet is pervasive in this country, and it is time we use it to get more Americans involved in the most cherished right of our democracy.

Welcome to the age of the e-vote.

The e-vote would allow Americans to register to vote electronically—as late as the day of the election. It would also offer the ability to cast votes over the Internet all day on Election Day. And e-vote would give Americans the option to vote electronically up to 30 days before an election, much like our absentee ballot system.

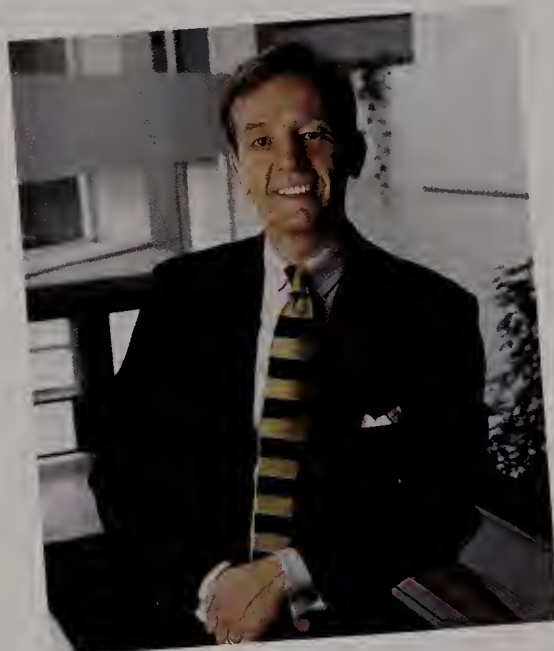
More than 50 percent of American homes have personal computers, most equipped with modems. Unemployment

is low and most working Americans have access to at least one networked personal computer that could be used to vote. America is ready for the e-vote.

Critics will surely attack e-voting on the grounds of security and privacy. Granted, no system is perfect. Even my colleague Lew McCreary has doubts about e-voting (see “e This, e That, e The Other...,” Section 2, Page 8). But unlike Lew I am confident that if we applied our country's best minds to these important issues, we would solve them.

CIOs and business leaders could play a significant role in the e-vote movement initial momentum. I see a snazzy e-vote icon optionally displayed on the home pages of every American business starting Jan. 1 of a general or midterm election year. A simple click of the mouse would take a potential voter to a designated secure site where he or she could electronically register and/or vote. Can you imagine the cumulative impact this campaign could have on our country? Not to mention the influence e-vote would have on developing democracies around the world.

Lou Gerstner, chairman and CEO of IBM, said recently that it is time to harness technology to serve democracy. He's right and e-vote is a way to do it. What's your vote on the e-vote? Drop me your ballot.



Gary J. Beach

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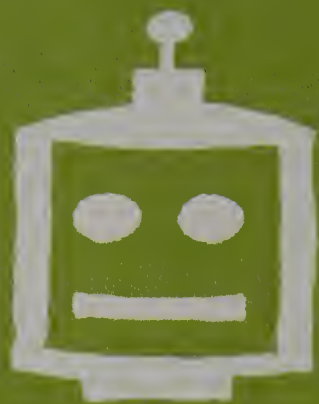
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Trendlines

NEWS, INSIGHT, HUMOR, REVIEWS

Edited by Sara Shay

Make Time for Face Time

MODERN COMMUNICATION Does electronic chatting help or hinder teamwork? Professor Ken Graetz and a group of his students at the University of Dayton's department of psychology are here to tell you.

To determine how the method of communication affects the way people share information with a group, they conducted a study based upon the "hidden profile problem." Participants were divided into teams of four and asked to review three proposals to build a new air reconnaissance system.

Next, the researchers gave each team member two types of information: facts the whole team was privy to and facts known only to that individual. Then the teams were assigned to communicate with each other to solve that problem either face to face, through teleconferencing or via electronic chat.



Graetz says groups have a tendency to discuss knowledge that is common among them without revealing specific personal knowledge that might be imperative to solving the problem. And this situa-

tion, as it turns out, is exacerbated when group members are not communicating in person. The study showed that none of the electronic chat groups was able to combine shared and unshared information to solve the problem assigned to them, while the face-to-face and teleconference groups were equal in their ability to solve their problems. Based on these results, Graetz discourages the use of electronic chat for "multiparty decision making that involves moderate to large

amounts of information exchange." So the next time you need a team of experts to brainstorm, you might want to put them all in the same room. ■

Digital Decor

HOUSE STYLE In today's ultramodern world, home is no longer only where the heart is—it's also where the hard drive is. And with the right computer furnishings, that home can become a more attractive and efficient place to work.

Computer users with aesthetic sensibilities and money to burn should check out the offerings of Beverly Hills, Calif.-based Oberhofer Hand-Crafted Computers Inc. The company produces a line of luxury alternatives to drab, gray,

plastic computer components that are more sophisticated than the lollipopular iMac. Oberhofer's suite of stylish accouterments consists of a monitor, keyboard and wireless mouse, all made out of hand-carved mahogany, maple or cherry. Though the price tag might prove hard to swallow (the monitor sells for \$3,995, the keyboard for \$650 and the mouse for \$350), the procedure goes down easy: Just toss those old, unsightly components and plug your existing hard drive into the new ones. The 14-inch flat-panel monitor and wireless mouse (which runs on two AAA batter-

The Oberhofer Classic series features gleaming hardwood and ebony trim...



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82% of companies **AREN'T PREPARED
to handle a computer system disaster.***

[Care to know if you're one of them?]

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*Comdisco 1997 Vulnerability Index®

Trendlines



...even on the matching mouse.

ies) save space and rid the computer area of those unsightly cords.

With the Windows 95-

enhanced keyboard comes

the option of a glass-etched

nameplate that can be cus-

tomized with a signature or a

company logo. The units are PC-compatible but can be adapted for a Mac. Future plans call for offering the system in materials such as aluminum, Corian and acrylic.

If you can't cough up the big bucks but like the idea of swank hardware, take heart: Oberhofer plans to offer a more moderately priced line in the future. "The idea is that you can have the quality that meets the rest of your environment," says David Balk, Oberhofer's vice president of sales and marketing, who predicts the new line will sell for about half the price of current products. If you'd like to see the products in action before you buy, channel surf to NBC's *Just Shoot Me!* or *Will & Grace*, both of which feature offices with Oberhofer wares.

But why keep all the pretty gadgets tucked away in the home office? We're keeping an eye on the futuristic work of Ted Selker, senior manager of user system ergonomics research at IBM Corp.'s Almaden Research Center in San Jose, Calif., who is developing products that make computers more involved in every room of the house. One example: The digital coffee table, which looks like a regular coffee table but plugs into a network, plays the radio and CDs and can access the Internet. The table projects images on the wall, so you can settle back on your couch pillows and pop a videotape into the table or surf the Web, all without having to deal with the mess of wires and cables. Also in the works is a couch that connects to your personal planner and lets you know if you have phone messages or tells you when to rouse yourself to get to a meeting. So far there are no plans to manufacture digital living room furniture for actual sale—it was developed as part of a study in the interaction of humans with machines—but one never knows. Someday even couch potatoes may have no excuse for avoiding work.

—Meg Mitchell

Y2K

COUNTDOWN

7 MONTHS & COUNTING

Are You About to Discard \$4 Million?

IT'S A PERFECTLY UNDERSTANDABLE DESIRE: the urge to get rid of redemption data in order to put the whole ugly episode behind you. Stop. Don't.

There's a chilling willingness on the part of IT staffers to discard Y2K testing information even though it contains a wealth of data about a company's systems, according to one vendor who works with clients doing both redemption and application development. Tim Brewer, vice president of consulting services for Phoenix-based Viasoft Inc., says that in deleting that information, you may be removing information about data items, how programs relate to each other and how different entities like JCL (job control languages), screens and maps relate to each other. Collectively, says Brewer, that information makes up your meta-data, which is frequently stored in a direct access storage device (DASD) disk farm or repository set aside exclusively for Y2K use.

Brewer recalls a meeting with a large Midwestern bank that wanted to take inventory of its systems with an eye toward setting companywide hardware and application standards. The bank planned to set aside nine months to do a complete code inventory, but Brewer asked if the bank hadn't already done that during Y2K remediation. As it happened, it had, but the bank had been on the verge of deleting the data to save disk space. Amazingly, sighs Brewer, "the inventory was considered disposable because it had the Y2K label on it." In addition to saving nine months of work, the bank was able to amortize the \$4 million it had spent to create the code inventory.

If for no other reason, companies should save all that data to help diagnose Y2K-related failures. Viasoft was conducting an independent validation and verification test for one financial services firm (for more on these tests, see "Time for a Y2K Audit," Page 74), and even though the system didn't crash, the test revealed that interest payments were being calculated incorrectly—to the tune of a \$22 million variance in its customers' favor. "How do you go back and find out what broke if you don't have the information saved?" asks Brewer. "You have to be able to reanalyze what you have done."

More important, when you resume development projects, your legacy systems may be the hub from which come initiatives such as ERP and electronic commerce. As Brewer warns, you can't throw away the hub and expect the wheel to work.

—Howard Baldwin

The Means to an Edge:

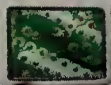
Creating a Business Model for e-commerce

Companies are using e-commerce to raise the level of service to their customers.

But without a sound business model e-commerce can also derail an enterprise.

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The sirens of e-commerce beckon, but it is time

to reflect on where you want to go

Creating a BUSINESS MODEL

for **E-commerce**

ENDORS AND COMPUTER industry analysts say that most companies haven't thought much about creating a business model for electronic commerce. Some firms are experimenting. Others are frantically rushing to stave off incursions by virtual retailers, which don't have the overhead of bricks and mortar. Sometimes, these companies have reacted blindly out of fear, and they begin to lose their identities, reputations and customers.

The imperative for a sound business model is growing. For example, according to a recent survey by the Cahners In-Stat Group, companies now doing a small percentage of their sales over the Internet are projecting major increases over the next two to three years. Of 261 companies surveyed in late 1998, the average was 6 percent of corporate sales, with a projected growth to 21 percent by 2000-2001. Nearly 40 percent of these firms are just getting into e-commerce. The time is now for companies to do serious introspection about the impact of e-commerce on their futures.

Creating a business model for e-commerce starts with the following basic challenge: to define who you are as an enterprise, then who you want to and need to be, and finally—within that context—what role electronic commerce can play in helping your enterprise maintain or change its identity.

The Chubb Corp., for example, likes who it is. E-commerce is meant to help Chubb Corp. sustain its reputation as a highly-rated property and casualty insurer with a strong network of brokers and independent agents. Hilton Hotels Corp. has always had a customer service model, of course, but service is being redefined in the hospitality industry, so Hilton Hotels is busy reinventing itself. E-commerce, as one might imagine, is indispensable in that effort.

For consumer electronics distributor Crutchfield Electronics, e-commerce is a natural next step in direct sales and service to its customers. Built on mail-order catalog sales, Crutchfield has the infrastructure to support sales via the Web.

At Boise Cascade Office Products, electronic commerce helped turn it into a more proactive supplier to major na-

tional and global accounts and now into a competitor in mid-size and small corporate markets—where the virtual vendors and superstores hold sway.

This white paper first takes a look at these companies, their business models and the resulting e-commerce models. It then turns to a diverse set of vendors of e-commerce products and services to

hear them talk about—surprisingly—the crying need for companies to take their eyes off the technology and focus on the customer.

I. The Enterprise View

Chubb: Improving on a Good Thing

B.C. Vierniero, assistant vice president of marketing and electronic commerce at The Chubb Corp. in Warren, N.J., says that his company looked at three choices in creating an e-commerce strategy for its property and casualty insurance business: “Do we create a new business model with e-commerce as one of the drivers? Do we spawn a secondary business model around e-commerce? Or do we use it as a tool within the existing business model?”

Firms Expect E-commerce Sales to Skyrocket

Electronic commerce is becoming a critical part of business strategy, according to a Cahners In-Stat Group survey of 261 companies representing a wide range of industries and company sizes. The respondents said as much, and they showed it in their sales expectations. On average, their Internet e-commerce efforts yielded 6 percent of sales in 1998, and they project that by the end of 2000 that figure will jump to 21 percent.

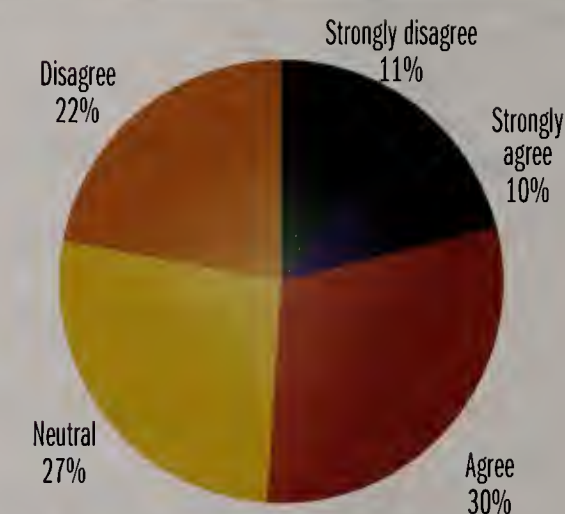
Let's put this another way. A significant number of these companies (36 percent) were doing nothing on the Internet in 1998, but virtually all said they plan to have some e-commerce sales activity by 2000. Another 28 percent are doing a minor amount of sales right now, but generally they expect to move into the 6 percent to 25 percent range over the next 24 months.

At the other end of the spectrum, just a handful of companies were doing 26 percent or more of their business on the Internet in 1998. However, 15 percent of these respondents expect to be in this category in 2000. Further, one-quarter of those surveyed say that e-commerce will be their primary selling channel within three years.

Based on the responses of those who are selling or expect to be selling products/services over the Internet by mid-2000, the survey also showed:

- Top management and marketing management are making the decisions on moving to e-commerce; typically e-commerce falls under the aegis of marketing and within the marketing/sales budgets.
- Companies within many industries—including manufacturing and retail/wholesale—were split on whether channel conflict is a big issue, often one-third saying yes, one-third saying no and one-third staying neutral. Finance and entertainment companies were most concerned; and by size, the largest companies see trouble ahead.
- Security is a major concern of the respondents, where they believe technology needs the most improvement.
- Of those with e-commerce operations, 26 percent had already achieved a positive ROI, and 54 percent will achieve it this year or next.
- The mean investment to date on Internet commerce (software, hardware, consulting services) is \$199,000. Software and hardware account for more than half of the investment.
- Most respondents use EDI for purchasing and selling, but within three years EDI will not be the primary way of conducting business with suppliers. Most (63 percent) will extend it to the Internet.
- While online order-entry is the predominant tool used for orders, fax and e-mail will remain major tools for order confirmation.
- One-quarter of those surveyed are already accepting Internet payments; another 31 percent will do so by sometime in 2000. Credit cards are the primary instruments, although use of debit cards and electronic cash and checks are growing.
- The most effective techniques to attract customers to a Web site are links to other sites, non-Internet advertising and techniques that ensure pickup by search engines.

Is Channel Conflict a Big Issue?



Source: Cahners In-Stat Group

The first option, creating a new business model, was easy to discard. “We have 115 years of success with this model,” says Vierniero. “We have a strong distribution network with our independent agents, and we believe our products match that distribution system. We don’t sell commodity-based products, but differentiated products that require some degree of explanation and a real understanding of customer needs. For example, do you know your auto policy does not cover the full value of your cars? Do you know that the ornate moldings in your Victorian home are not covered unless you have full replacement costs?”

The next choice, developing a sec-

ondary model for going direct to the consumer, wasn't an alternative either—even if it could be successful. “Disrupting the relationship with our agents and brokers wouldn't be worth it. It also requires building an infrastructure: a call center staffed around the clock, technologies for processing tasks that agents and brokers traditionally do, and development of a well-educated sales force.”

The third alternative, e-commerce as part of the existing business model, offered Chubb many opportunities to further differentiate its products and services. Also, there was pull from customers and agents. Chubb insures many high-tech companies, such as Netscape, says Vierniero, and they want to have easy electronic access to their business with Chubb. “Our agents began telling us more and more that their clients want to deal with us in the e-commerce world.”

Therefore the opportunities arose from “being able in a short period of time to include your business partners and your customers in your internal infrastructure,” Vierniero says. This amounts to using the Internet to let the customers for both commercial and personal lines serve themselves in increasingly more sophisticated ways. It also provides a link with agency management systems and enables global collaboration between Chubb people and its distribution network.

For example, Chubb has always created specialty programs for infinity groups, such as law firms, broadcasters and cargo shippers. “We first built DOS-based systems for them, then migrated to Windows. That put us in a position of being a software vendor and worrying about infrastructure,” Vierniero says. “So along comes the Internet, which allows us to build systems on the Internet so these groups can self-serve—for instance, a cargo shipper needs a certificate of insurance for each shipment. Rather than come to us, we let companies anywhere in the world create their own certificate, send it over the Net, and we bill them once a month for all certificates. All they need is a browser and \$19.95 a month for the connection.”

FTD Chooses Unisys for E-commerce

FTD Inc., the world's leading floral organization, recently purchased a Unisys ClearPath HMP IX 5600 enterprise class server to extend its Mercury Network to support electronic commerce capabilities.

Its primary requirements were the ability to handle enormous traffic with high reliability and availability. FTD's Mercury Network is one of the largest proprietary telecommunications networks in the world, linking FTD and many of the more than 52,000 associated retail florist shops in over 140 countries.

FTD also has a sterling reputation to protect and maintain. Founded by a group of florists in 1910, FTD has become the world's largest floral organization and the only one to offer consumers a “100 percent satisfaction guarantee.” Clearly, FTD wanted to develop and implement Internet-based business technology reliable enough to support its florists' needs.

Unisys ClearPath enterprise servers meet those requirements, combining Unisys' proven mainframe application environment with applications and databases for Windows NT.

FTD's new enterprise server supports all order processing for the FTD Mercury Network, with the Windows NT-side planned to support future electronic commerce capabilities. In addition, FTD recently introduced the new Windows NT-based Mercury Wings system for use by its associated FTD Florists. The integrated system comes pre-installed with proprietary FTD Mercury software, Microsoft Office Professional Edition and a host of bundled business software. This system provides quick and efficient access to the FTD Mercury Network, streamlines wire-order processing and supports the retail florists' sales and marketing activities.

Unisys ClearPath enterprise servers—one of the most successful product families Unisys has ever released—feature the industry-leading Unisys Heterogeneous Multiprocessing (HMP) architecture. This unique architecture enables customers to run legacy mainframe applications and databases and those based on UnixWare and Windows NT side-by-side on the same server.

Consumers around the world can order flowers from FTD by visiting any local FTD Florist, by calling 800 SEND-FTD or by logging on the FTD Web site at <http://www.ftd.com>

Another major opportunity is in multinational organizations. “When you have to write a policy for a multinational company that may do business in 20 countries, it's a huge nightmare,” Vierniero says. “Typically, either no one can pull this off and the client tells his business units to worry about their own coverage in their own countries, or a local agent or large broker will cobble something together. We can create a system that ties together brokers and Chubb people in all 20 countries so that we can resolve specific coverage issues in any given country. This gives us capability and speed to market not possible before. With the soft market in insurance these days, we can get a little more competitive in terms of pricing because of the way e-commerce allows us

to process things internally.”

Chubb opened its first Web site in 1996, primarily offering information on insurance and from there proceeded to develop smaller Web sites linked to special interests. For example, at sites for wine collectors, a Chubb mini-site describes insurance issues for such collections.

This year Chubb will begin implementing a host of transactional applications, having already developed a hierarchy of security technologies and techniques.

For instance, personal lines customers will be able to view the status of their claims. Commercial lines customers will also have online access to their full policies. The next wave will be providing commercial customers access to a data warehouse and analytical tools for exam-

ining the business they do with Chubb and their policy-usage records.

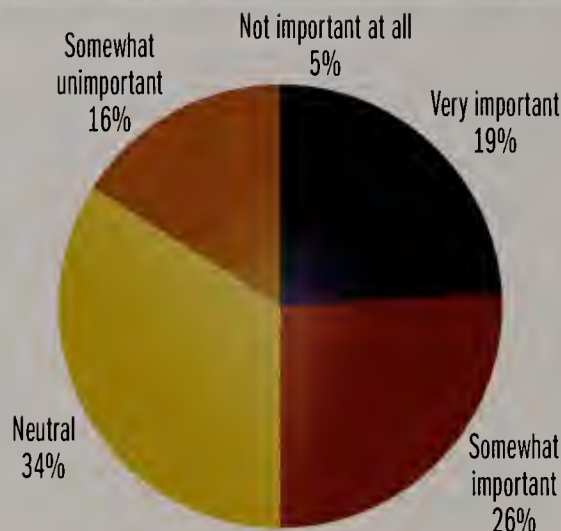
Hilton Hotels: A New Definition of Service

Hilton Hotels Corp. is trying to take customer service to levels never possible before the Web, says Bruce Rosenberg, vice president of market distribution. Right now, via Hilton.com, it has one of the fastest online reservation systems in the business (two minutes average). Plus it offers any traveler hotel information and visual guided tours through Hilton's hotels around the world. Frequent guests can go to the Web site to join the free HHONORS reward program and enjoy the varied benefits, including services automatically tailored to their preferences based on previous stays. Meeting planners can access the Web site for group reservations, digital floor plans and the like.

Once in the hotels, travelers can use Hilton's 24-hour business center kiosks of computers, with Internet access, as well as copy and fax machines and more. Some hotels even offer life-size TeleSuite Networks to conduct meetings or cele-

brations with participants located anywhere in the world, appearing life-size on screens. Soon to be rolled out are wireless Internet access and, in guest rooms, an interactive online service, information and entertainment system.

E-commerce: Is It an Important Business Strategy?



Source: Cahners In-Stat Group

"When we first presented the concept of a Web site to senior management, there was a lot of support and skepticism. Just having a Web site doesn't play in our corporate environment; there have to be goals

and a return on investment," says Rosenberg. "To do a Web site you have to do it right, and we have to take a whole approach to change the business model. What we are doing today won't work anymore."

Hilton wants a higher percentage of the travelers' business—35 percent to 50 percent, Rosenberg says, which means it has to take "brand and the experience the customers have with us to a level never done before. The Web opened up people's eyes about how we can do and should do business. We looked at all the business models—every customer segment from the business traveler, the tourist, the meeting planner, the travel agent—and identified the electronic commerce way of doing business with them."

This has to do with information, interactivity, reservation functionality and personalization. "We want profiles on the customers, their history with us, what they like and don't like, accessible no matter where they touch us in the world," Rosenberg says. "The Web has allowed us to redefine the contacts and touch points, and the more information we have the better we can do."

Media Giant and Human Rights Organization Revamp Security

With public and internal access to its information and systems growing at a fierce pace, a major multinational media company turned to IFsec, LLC, a division of Interactive Futures, to conduct a thorough Internet security study. Although this company had an existing firewall, executives were concerned about its effectiveness. Their numerous online retail Web sites, as well as their internal Internet services to LAN users on the corporate network appeared vulnerable to attack.

IFsec, a leading security consulting and implementation firm headquartered in New York City, was asked to probe the company's corporate network and Web site for weaknesses. After a targeted vulnerability assessment, the IFsec team located several serious problems, including an inadequate configuration of the internal network hosts and a significant

vulnerability at dial-up access points.

Because of the perceived protection offered by a state-of-the-art firewall, the company had become lax in its security practices—a clear demonstration that good technology alone does not guarantee complete security.

IFsec worked with the media giant to address these vulnerabilities by implementing:

- A companywide network security policy
- Security patches and configuration changes to the server software to enhance security and maintainability
- An authentication system to reduce vulnerability to dial-in attacks

Human Rights Organization Heads Off Attack

An international human rights organization had become increasingly reliant on the Web to disseminate information on human rights violations. The organization's man-

agement, however, grew concerned that individuals opposed to the group's work could hack into its Web server and compromise the server's reliability—or worse, falsify the content.

A great deal was at stake. The negative publicity that could result would undermine its reputation, impede its work and curtail its fundraising. In response, the organization's directors asked IFsec to attempt to hack into the system through its Web site.

The IFsec team, using a variety of hacking tools and techniques, ultimately discovered fatal flaws in the firewall and network architecture. The team demonstrated to the organization how hackers could easily crash the Web server and access critical Web site directories. The IFsec team completed its work by implementing advanced security procedures that eliminated those vulnerabilities.

PKI

THREE LETTERS THAT MAY CHANGE THE WAY YOU DO BUSINESS.

A **Public Key Infrastructure (PKI)** forms a repository for your organization's security information. A PKI functions to support E-commerce initiatives and can be used for authentication, authorization, and non-repudiation mechanisms. Through a robust PKI, a corporation can effectively implement digital signatures, secured business work flow, single sign-on and encryption for critical corporate information management.

IFsec has the experience and industry knowledge – gained in domestic, international and government security arenas, and by partnering with Sun Microsystems™, the original “dot com” company – to help your company design, implement, and manage the PKI systems most appropriate for your business environment.



IFsec can also assist your company with a wide range of network security service offerings – including security policy and procedure development, firewall and authentication system installation, penetration analysis and site monitoring.

For more information on how **IFsec**
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site rocks
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Stewart Stearns,
Tower's Manager of Online Development
www.towerrecords.com

Tower Records counts on F5 for safe, secure, 24/7 E-commerce stability.

“ Our BIG/ip® system has been one of the most stable elements in our entire web site. Because it directs the user to resources that are available and bypasses those that are not, our site is always up and, as a result, customers feel safe and secure. Perhaps more important than the product itself has been



Situated between router
and server array

High availability & QoS
for business-critical web sites

Intelligent load balancing

Internet, Intranet,
Extranet/E-commerce

Massive scalability
& fastest access

the extraordinary level of service that F5 Labs has provided. From the beginning, I recognized that these were dynamic folks who both intuitively understood what we were looking to accomplish and were every bit as committed to the success of our venture as we were. Tower is proud to have found a partner such as F5 Labs. BIG/ip and F5 Labs have made our lives a lot easier. ”



He says that Hilton has pieces of a "totally integrated customer environment," with very good profiles of its most frequent guests: the HHONORS members. But the information is not as good, he notes, on customers that occasionally travel with Hilton—who number in the tens of millions per year and represent major opportunities for revenue growth.

"The new systems we are building will allow us to have a larger number of profiles and a finer segmentation of our customer base. The Web will enable us to reach them cost effectively and develop a deeper personal relationship," Rosenberg says. "We just couldn't do this before by mailing collateral to them. The budgets weren't there to support it."

The new business model for Hilton is an expensive venture, however, annually costing "seven figures" for the Web site alone. Getting more business from each customer demands catering to their very specific preferences in hotel rooms (location, bed size, Internet services, etc.) as well as food and other amenities, which is far more complex and costly to manage.

A key issue is balancing the trade-offs between such levels of service and their costs. He emphasizes that management is "big on alignment. We pull people into a room to look at impacts of marketing and service initiatives and how to remove barriers to entry through technology or other solutions. To handle the complexity, we've increased the education and knowledge level of our people."

The incentive is there because Hilton's Web site has been providing returns. "We know how many visitors we have to our Web site, in the millions every month, and how much revenue they generate," Rosenberg says. "We have a positive return any way you want to analyze it."

Boise Cascade: From Reactive to Proactive

Boise Cascade Office Products Corp., a \$3.1 billion international distributor of office and computer products, office furniture and paper, has Fortune 1000 companies and large global 2000 com-

Fail-Safe is BIG/ip Music to towerrecords.com

Tower Records is one of the world's largest music retailing organizations, with more than 217 stores around the globe and over \$1 billion in annual revenues. When it opened its online store (<http://www.towerrecords.com>) in 1996, it began a new era of service for music lovers.

Twenty-four hours a day, visitors to its site—more than 6 million per month—can select from an online database with over 275,000 titles and such information as album-cover art and audio samples. The site also tracks customers' tastes and automatically notifies them of new releases.

Crucial to Tower in developing the Web site was uninterrupted service, says Stewart Stearns, manager of online development. "An error message because of a dead link to an inoperable server could cause the customer to lose confidence in our Web site and feel insecure entering sensitive information."

When it came to server reliability, Stearns opted to replicate all Web applications and content across the servers. But still unresolved was how to allocate incoming requests across the array in fail-safe fashion.

Stearns then discovered BIG/ip from F5 Networks in his product search. BIG/ip is a high-availability controller that intelligently allocates Internet, intranet and extranet/e-commerce user requests across redundant arrays of network servers, regardless of platform type or combination. The F5 product, which resides between Internet routers and NT servers, continually monitors each server for application availability and performance. When Web queries come in, it automatically directs them to the most appropriate and available server.

By balancing all Web requests across NT servers, BIG/ip substantially reduces server failures. Moreover, with BIG/ip's built-in redundancy, there is no single point of failure—from backbone to server. The product also allows Tower to perform scheduled maintenance and upgrades, including network upgrades, without interrupting customer service and losing revenues, says Stearns.

The end result? "Our site is always up, and our customers feel safe and secure," Stearns says. He adds that a source of comfort to Tower Records has been the exemplary service provided by F5's personnel. "Just knowing BIG/ip and F5 are there has made our lives a lot easier."

panies as its core customers. Its strength is being a one-stop shop (and as a result, the source of aggregate information) for thousands of items companies must keep in stock.

Driven into electronic data interchange (EDI) a dozen years ago by its powerful customers and the emergence of super-stores like Staples and Office Depot, "it finally dawned on us that e-commerce could be a competitive advantage, providing a way for us to lower our customers' costs and ours," says Laura Longcore, senior manager of electronic commerce.

Early in the '90s, Boise developed a PC LAN-based system for ordering, which had about 2,000 customers on it. Late in 1995, with its eye on the Internet, the

company went to 15 of its largest customers and said, "Let's build a prototype of the perfect ordering vehicle."

"They helped us build a business case," says Longcore, "and early in 1997 we were the first in our industry to launch a Web-based ordering system, I-97, offering 200,000 items." It wasn't an easy task, as no adequate business-to-business software existed at the time. "Working with Netscape and others, we designed the product for large corporate customers, with 70 different parameters that can be customized to adhere to the business rules of each company. For example, how much can be ordered before approval is required, are you allowed to use a credit card and what vendors are approved?"

She continues, "We didn't know what the return on investment would be, but if we could get enough customers on board, we would lower our costs. It costs \$3.40 to process an order manually and \$1.80 electronically."

By the end of that year, 1,500 companies were online and 1 percent of Boise's orders were being processed over the Web. By the end of 1998, 4,000 users were sending 5 percent of their orders via the Internet. And as of this March, it looks like Boise will cruise past its target of 10 percent for 1999.

From the reactive beginnings with electronic commerce, Boise has come to

view it as crucial to its entire business strategy, "a marketing and sales tool and a new channel for us, not as much as means to lower costs, but as to build information and relationships," Longcore says. Through growth and acquisition, Boise has more than doubled its national accounts to 17,000 since 1995. I-97 is enabling it to move more aggressively into the middle market, and, using a small I-97 subset and direct mail catalog, into the small office and home office markets. Internationally, it is expanding into non-English-speaking countries as well.

Given that disintermediation by suppliers of its products isn't an issue,

according to Longcore, electronic commerce has tightened Boise's relationships with suppliers. "With catalogs there were limits on the product information we could include. With the Web site, if the supplier wants it, we can include a 20-page spec sheet. Another example," she notes, "is that Daytimer does a ton of research on how people manage their time, and we can offer that kind of research to our customers. Also, the Web has made experimenting easy, so we can work with suppliers on different approaches and services."

Crutchfield Electronics: The Good Fight Against the Gray Market

Selling consumer electronics products over the Web is a natural progression for Crutchfield Electronics, which has long sold the products of major manufacturers like Sony and Rockford through mail-order catalogs. As Robin Lebo, director of customer acquisitions, points out, the basic infrastructure is there—the distribution center, the back-end systems, the merchandising and catalog-development talent as well as onsite authorized repair. "We have the ability to take a sale, process it, fulfill it, service it. We know what our inventory is and can guarantee delivery," Lebo says.

Companies such as Crutchfield are working to protect their reputations for speed, quality of service and ethics—both with the help of and in spite of electronic commerce. Business models such as Crutchfield's are under attack by the virtual retailers who carry no inventory, provide no services and, in some cases, take orders for product lines that they are not authorized to sell—the gray market. By contrast, Crutchfield, which is authorized to sell dozens of manufacturers' products via its catalogs, has gone through the lengthy process of obtaining authorizations to sell those same products over the Web and has thus far garnered approvals from 25 companies.

"Bizrate.com [a Web service rating operation] ranks us consistently number one in service and sales," Lebo says. "We

Online Purchasing Delivers \$5 Billion Annually to the Bottom Line

By the end of this year, a major global automotive manufacturer will move nearly \$16 billion worth of purchasing and payables activities related to maintenance, repair and operations (MRO) to the Internet. The expected result: a 30 percent annual reduction—nearly \$5 billion—in processing and transaction costs.

The companies providing the solutions to achieve this operational windfall are The Chase Manhattan Bank and Intelisys Electronic Commerce, which is affiliated with Chase.

Intelisys electronic procurement solutions use both intranet and Internet technologies to enable authorized employees to buy from contracted suppliers' electronic catalogs. Buyers can search, select and execute catalog orders, then make the payment electronically. A customized enterprisewide workflow process integrates order approval, merchandise receipt and vendor payments to reduce both cycle times and processing costs. This speeds the overall transaction flow between buyers and suppliers.

A number of multinational companies have turned to Chase for help in transforming their global purchasing-to-payables operations. In the case of the aforementioned auto manufacturer, Chase is managing the payables transactions as an outsourcing service. "Chase's expertise in handling financial transactions gives us a unique end-to-end view of the e-commerce value chain," says Susan J. Webb, senior vice president and technology executive for Chase Treasury Solutions. "We are looking at electronic commerce at two levels: changing how we do business with our clients and changing how our clients do their business."

During the next two years, the global automotive manufacturer will use business-to-business e-commerce to construct a worldwide trading network that will change the way it does business with up to 5,000 suppliers. This, in turn, will change how those suppliers do business with their customers.

The automotive giant believes it can leverage e-commerce innovations to streamline business flows and reduce company spending. The initiative will also allow the Internet-enabled suppliers to extend their new online capabilities to other businesses, creating a ripple effect that could pull tens of thousands of business-to-business buyers onto the Internet.

do sell authorized equipment, we don't attempt to hide our fees and we're the leader in technical and customer service, including easy returns."

Crutchfield's first step into e-commerce came several years ago, when it opened up a site full of catalog pages. Two years ago, it began taking orders and payment over the Web and now averages 60,000 visitors a day. "We have seen incremental sales increases because we're reaching a second layer of the market that we haven't been able to capture through the traditional advertising method," Lebo notes.

Crutchfield, which is now spending 30 percent of its ad budget on Web advertising, is aligning itself to vendors with good reputations and strong brands, working, for example, with CDNOW on cobranding and cross-promotions, and advertising itself on Amazon.com. Lebo's main advice for companies developing e-commerce models: "Make sure you have a reputation of trust, a good infrastructure and a clear set of goals for your Web site."

Chase: Master of Electronic Delivery

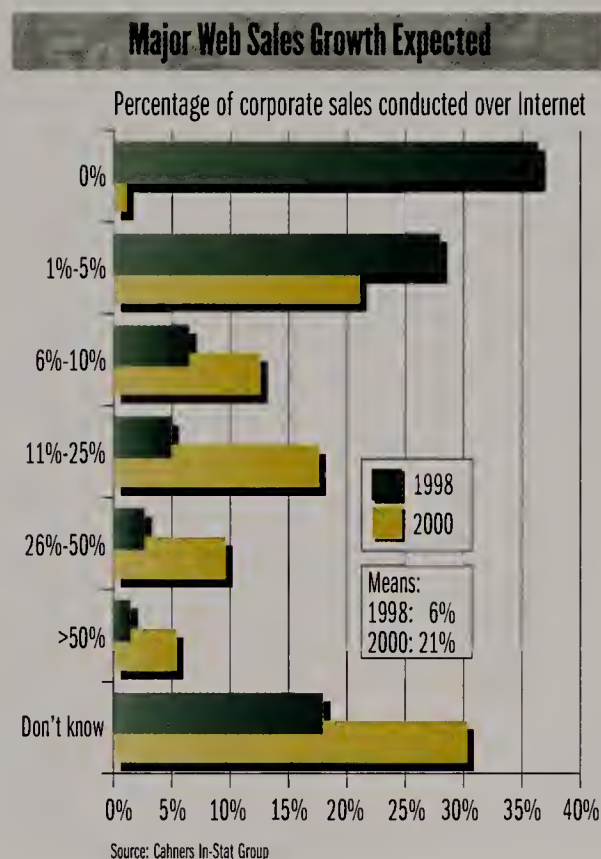
Because of the blurring of the lines between information and financial flows, Chase Manhattan Bank NA may all at once be a client's financial institution, software provider, business process reengineering consultant and outsourcing service. In short, Chase will help companies change their processes and take over the execution of some of those procedures as well.

Chase is recognized in the industry as a "master of electronic delivery," offering the best understanding of payment and collection systems today. And clearly the Internet is enabling a variety of services around that competence.

Susan J. Webb, senior vice president and technology executive of Treasury Solutions, says that "Chase's vantage point is to help clients reengineer overall purchasing-to-payables operations. Purchasing MRO (maintenance, repair and operations) supplies generates about three-fourths of the payables in a large corporation, and they are looking more

and more to outsource this non-value-added activity."

At the same time, clients using Chase's Internet PaySource product can conduct financial EDI over the Internet, which is infinitely less expensive than using value-added networks (VANs). That is less than \$500 per month, with minimal upfront costs, compared with proprietary EDI expenditures of more than \$100,000 and monthly usage fees of up to \$10,000.



Chase is also enabling clients using a browser to access Chase databases to answer their own queries on account activity, investment capabilities and information reporting.

Webb sees enormous opportunity in electronic commerce for companies, particularly smaller vendors who can now attack new markets at lower costs. Chase sees a major role for itself in enabling their growth, not only with services but also through the Global Trust Organization. "Through this entity, formed by several banks, we will certify our clients and validate their ability to do business on the Internet," she says.

II. The Technology Vendor View

Focus on the Customer

"In general the market is all over the place in terms of true business assess-

ment about what is achievable by going into e-business. There are many mis-spent funds for solutions that will never deliver value," says Barbara Babcock, vice president of electronic business at Unisys. "The sense of urgency to get something going is so strong, we try hard not to let customers talk us into doing things they won't get value from."

She points out problems faced by companies like Borders Books, which was in such a rush to respond to Amazon.com's success that its initial Web site failed, providing "no business value." Even where the business model looks good, there are startups that haven't made a nickel, she says. "One problem is that they are technology-focused rather than customer-focused. Many companies can give me wonderful stories of how their Web sites have been integrated with their transaction systems, but not much about how the customer wants to interact." This shortcoming makes the business-to-consumer side extremely risky.

On the back end—the supply chain—the problem is entirely different. "You are not enticing someone to buy, typically, but presenting facts about what is for sale, the price and how it will be delivered. Those sites are focused on more streamlined operations, and they pay more attention to technology choices and strong implementations—rather than snazzy marketing," Babcock says. "The buying chains are established. The early work in the business-to-business supply chain is more well-thought-out and more cognizant of where the value is in the supply chain."

She continues, "Over time, the two have to interoperate. You have to manage the connection between your customers and your suppliers. We are changing the way that interaction takes place—the beginning of the invention of new business models that are possible because of electronic business."

A dramatic example is the Internet banking arena, where the economics are quite compelling: The per transaction cost has dropped from \$2 to 10 cents. But just as important, the relationship with



18,000 DESKTOPS,
17 MAINFRAMES,
242 FIELD OFFICES,
522,000 UPGRADES,
329 SERVERS,
2,046 WEB PAGES,
35,000,000 HITS.

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The Advantage of Information[™]

An Electronics Innovator Maintains Its Sharp Edge

The Service Division of Sharp Electronics (Europe) is leveraging the Web to improve overall responsiveness and customer satisfaction.

To ease the administrative burden and streamline activities for its partners throughout the order cycle, Sharp is giving its distribution channel Web-based self-service access to its order-entry application on the host. Sharp supplies a complete range of parts for products, such as VCRs, microwaves, camcorders, laptops and photocopiers, to sales subsidiaries throughout Europe in addition to resellers and large retailers such as Wal-Mart.

Sharp simplified its entrance into e-business by leveraging the company's existing investment in hardware and software while minimizing its risk. Sharp's partners are pleased that they receive parts about a day faster on average. Since the order-entry application is available 24 hours a day, 7 days a week, orders can be placed around the clock. The new system also expedites the ordering process by identifying erroneous order information and helps customers resolve problems immediately. To top it off, Sharp maintains its image as an innovative brand while stream-

lining the company's internal processes and reducing costs.

Attachmate's Consulting Solutions organization built the application for Sharp using the Attachmate e-Vantage HostPublishing System, a Web-to-host development platform that allows users to access IBM mainframe and AS/400 host information via any browser.

"We looked to Attachmate for a solution because we've been in a long relationship with them and are very satisfied with their products, service and support," explains Peter Steffen, manager of the EDP Systems Program at Sharp Electronics (Europe). "We did investigate other solutions, but Attachmate best addressed our strict requirements."

Those requirements have been met. In short, Sharp's new self-service order-entry application simply makes it a company very easy to do business with. The application allows customers to easily place orders through the convenience of their Web browsers—orders go immediately to the host, with no time zone restrictions. Customers also help themselves by using handy features, such as replacement-part searches, and ultimately receive Sharp's parts faster.

the customer has changed. "If you don't have tellers, how do you identify yourself as a bank? You are disenfranchising yourself, and you have to find new ways to provide value," she says.

In the public sector, the Internet is changing the relationship between government and its constituents, according

to Babcock. Unisys has worked with four provinces in Canada to build a regional Internet infrastructure—Atlantic Canada On Line—to rapidly deliver information and services to its constituents, cutting time and frustration out of bureaucracy.

It's worth noting that the relationship

between the supplier, Unisys and its customer, the provincial government, is changing as well. They collaborated on the entire fundamental question: How can the government use the ubiquity of the Internet to run itself better?

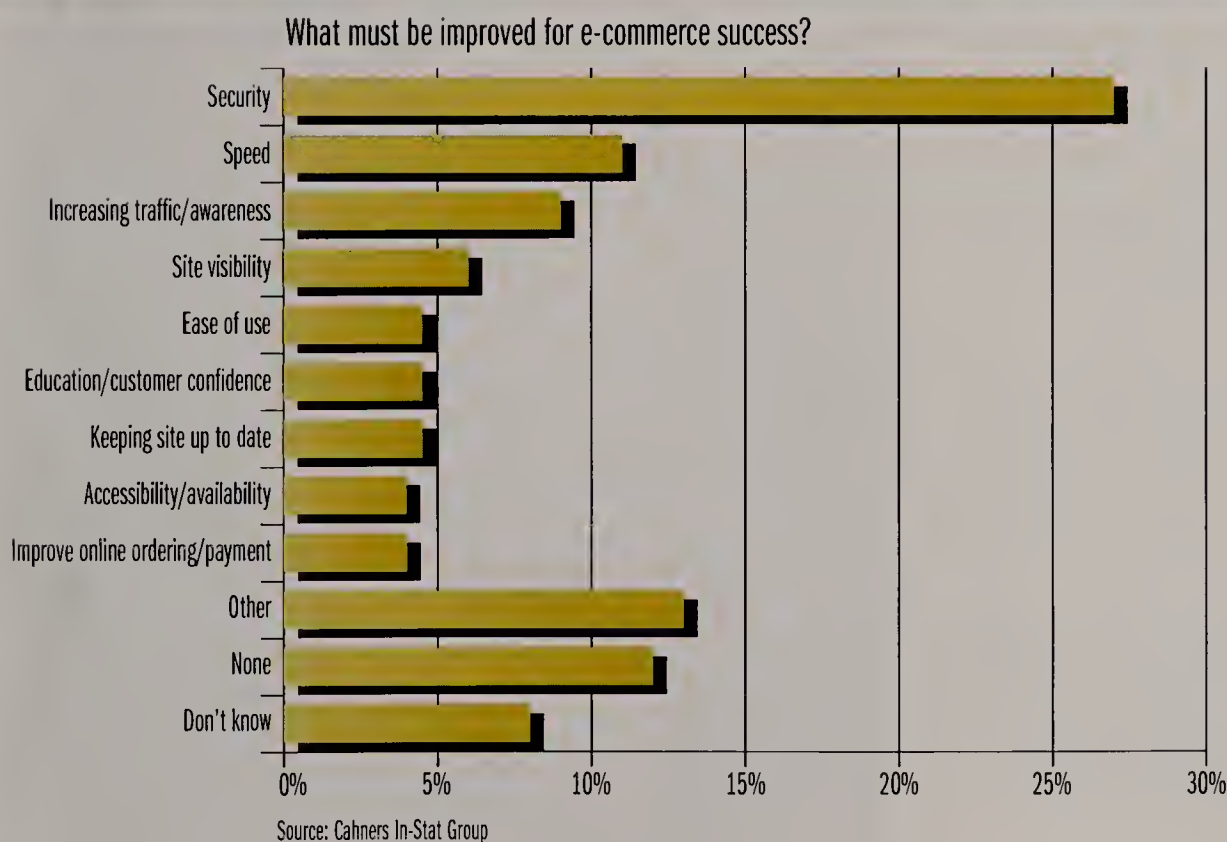
"You frequently have the option to decide if you want to be a vendor or a partner in a project. Companies such as ours have the technology and the expertise because of e-commerce, so there are a range of possibilities." Opting to partner, Unisys is receiving payment through a percentage of the transaction fees.

Security: #1 Concern

A Cahners In-Stat study (see page 4) points out that companies consider security to be the major problem for electronic commerce in the business-to-consumer and business-to-business sides. In the Chubb example, Vierniero notes that the implementation of transactional applications on the Web were held up until a full security system could be implemented.

David Remnitz, cofounder of high-level-security consulting firm Interactive Futures, says, "Security is of absolute importance in the electronic commerce

Security: Improvement Is Critical



model both on the business-to-consumer and business-to-business sides."

The horror stories are mounting. "We recently had a company come to us for help because 20,000 credit cards had just been stolen," he notes. "On the retail side, in addition to credit cards, hackers have culled demographic databases and transferred them to competitors. We've seen instances where competitors have tried to bring down a competitor's Web site or force it to deny users access. We love to see companies be proactive and come to us before this kind of disaster occurs."

The fact is that the security model is developing rapidly, evolving from one of discouraging access through perimeter protection (firewalls and authentica-

tion devices), to one that requires public key infrastructure (PKI) components. These consist of authentication mechanisms (to ensure that the consumer or business partner is the right individual to consummate that transaction) and enforcing non-repudiation mechanisms (in essence, documenting that a transaction occurred).

Business-to-business networks are now being developed in legal, retail, automotive and other industries where, based on PK identity, companies are allowing business partners access to secure Web sites and information sources, says Remnitz. The partners are registered in a certificate authority which maintains a database of end-user or end-point identities, as well as a dig-

ital certificate that allows them to conduct business in a secure fashion.

Many companies are also deploying sophisticated monitoring tools and practices, such as intrusion detection systems (IDS). These new systems secure the network by looking for suspicious activities, somewhat analogous to a motion detec-

We've seen instances where competitors have tried to bring down a competitor's Website or force it to deny users access.

HP Users Buy Big Servers on the Web

To satisfy their growing demand for high-powered servers with more than 99.95 percent uptime, Hewlett-Packard Co.'s largest customers turn to HP's Enterprise Computing Solutions Organization. But now, instead of leafing through thousands of printed catalog pages, IT managers, ISPs and HP's tier-one resellers can log on to <http://eproducts.hp.com>, where they can put together million-dollar server packages.

This global solution was developed by HP's Enterprise Systems and Software Group (ESSG) and INTERSHOP Professional Services. The new Web site went live after only four months of development, meeting HP's tight timeline and offering all key functions.

The benefits for partners and customers were clear. But the complex undertaking was fully justified when HP's studies revealed that the e-commerce initiative could reduce marketing expenses and administration by more than \$100 million a year.

Today, a complete selection of servers, from the A-Class to the high-end V-Class, is available for configuration to order at the e-products site. "It's complex but fool-proof," says Tim Nolte, a manager in the ESSG e-commerce program in Cupertino, C.A. "With our custom configuration tool even 6-year-olds can't make a configuration mistake as long as they can click. We guarantee that every cable, every processor and every I/O card works with the selected equipment."

INTERSHOP, a leading provider of e-commerce systems and services, was selected for this project because it had already proven itself, having worked with HP on several e-commerce projects. "INTERSHOP was a logical choice because of its knowledge of our business and its ability to deliver the solution within a short time," says Norbert Breit, e-commerce development manager at HP in Germany.

INTERSHOP's strengths are embedded in the e-products site, handling pricing, quotation and ordering. The multilingual and multicurrency features have helped HP make the solution globally available. The openness of INTERSHOP's Enterprise platform was critical for integrating the storefront with HP's Global Pricing System, a proprietary legacy system. Says Nolte, "Thanks to INTERSHOP's browser interface, we can have a worldwide team manage the content on this site."

tor. Pharmaceutical companies seeking to protect access to research technology and retailers protecting demographic databases are major deployers of IDS.

Remnitz advises that before electronic commerce begins, companies should

- Put in place a well-thought-out security policy, where employees and partners are educated about appropriate security practices
- Assess the network, its systems and applications through professional hacking
- Be proactive about protecting perimeter segments of their networks, Internet connections, partner connections and any telecommunications facility that trespasses into the corporation. Protecting dial-in assets may include anything from firewalls and authentication, to biometric devices for data center rooms
- Protect assets through alarm systems, such as IDS, so that there is a 24/7 guard on duty on the network
- React quickly to attacks and have help in place to determine who attacked the network and how, and to restore the company to an operational standard
- Have legal counsel identify regulations and standards being developed in many industries to protect privacy

The left side of the advertisement features two vertical panels. The top panel shows a close-up of a large pile of coins, with a circular metal ring or coin slot partially visible in the center. The bottom panel shows a thick stack of US hundred dollar bills, with the top bill clearly visible, showing the portrait of Benjamin Franklin.

E-Commerce Solutions Can Produce One of Two Results

**Choosing the right result is easy.
But which e-commerce solution
is right for your Enterprise?**

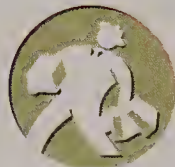
Since 1994, INTERSHOP® has delivered e-commerce software that produces a solid return-on-investment. We have over 9,000 installations worldwide, more than anyone in the business.

Our customers have deployed in less than 30 days. Realized return-on-investment in three weeks. And earned \$1 million in the first month. Our technology even hooks into your existing ERP systems, such as SAP® R/3 and Oracle®.

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Creating
the
Digital
Economy™



INTERSHOP®

- Collaborate with suppliers and customers about supply chain security issues

Interactive Futures, he says, has a large project securing transactions as they flow end-to-end through 20 companies in a supply chain. "They are looking at solutions that will allow them to know about information as it flows from one company to the next and prevent compromises in security systems."

William Boisvert, president of Attachmate, a specialist in server-based Web-to-enterprise solutions, emphasizes that points of access to host systems and specific data and applications within them are crucial security points within a technology infrastructure.

Performance Measurement: The Customer View

David Caddis, vice president of solutions management at Candle Corp., believes that "as the business computing model changes from centralized to distributed to truly networked computing based on the Internet, the business becomes infinitely more reliant on availability and performance of the network."

"It's difficult to understand what's happening in such a complex environment, leaving your site, going through the Net to some unknown customer," Caddis says. "How you guarantee service—the performance and availability of the business computing environment—becomes very complex."

plement," says Caddis, "is technology that measures the customers' experience each time he or she accesses the Web site. By experience, I mean the round-trip response time, the amount of time a customer spends on a Web page, the path the user takes to navigate through a site." To be most useful

... one of the ultimate measures of quality for e-commerce systems is response time to users.

the information gathered should be broken down by client, network, server and individual objects on the Web page.

The issue is the design of the storefront, he says. "The same way the Sam Waltons of retailing designed their stores around the way they saw their customers move through their stores, people in the e-commerce world will have to differentiate themselves with the same kind of information." Also critical will be the ability to analyze customer trends over time, Caddis notes, which requires a data warehousing capability.

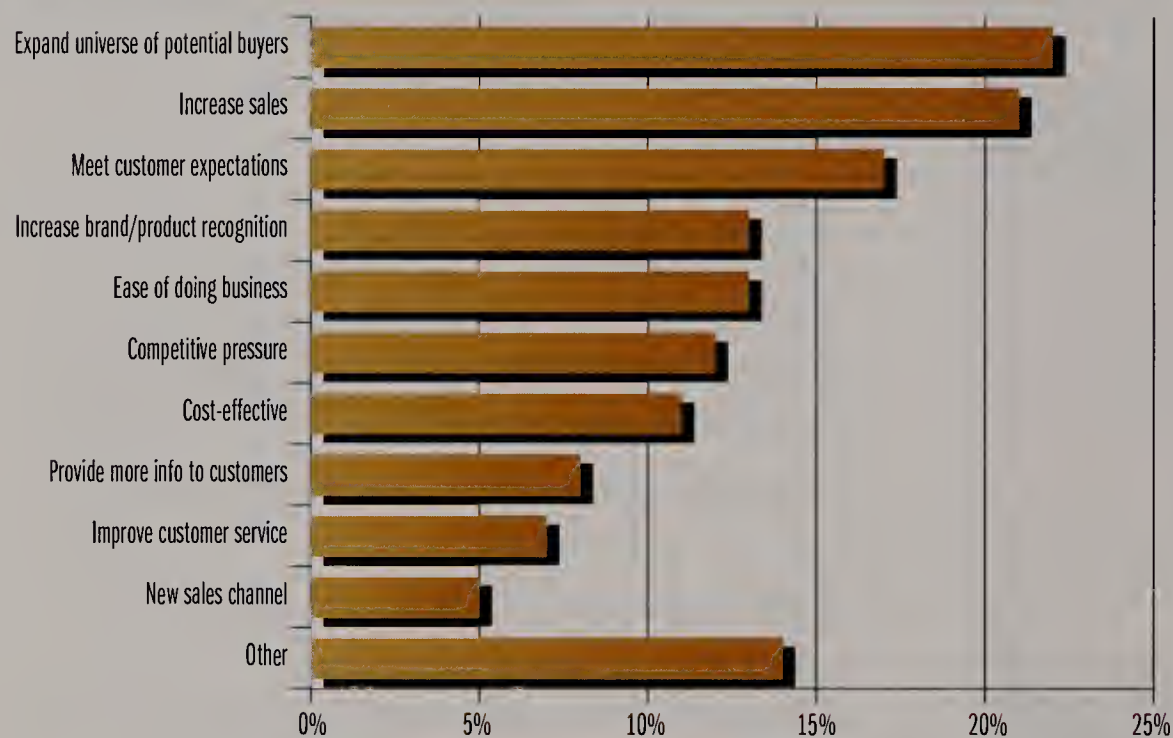
Performance Solutions: Service-Based Availability

What are some of the performance solutions? Jeff Hussey, CEO of F5 Labs Inc., a specialist in load-balancing and service-based availability, concurs that one of the ultimate measures of quality for e-commerce systems is response time to users.

A major technological problem for both business-to-business and business-to-consumer sites is that "with Web servers, you can't predict your capacity needs. You can't predict public behavior. You'll run a promotional campaign and link it with an interactive campaign, and boom, you can have a zillion people reacting to that, because there is no limit to time and space. Servers are not built for that burst," says Hussey.

What can happen when the customer tries to access the Web site? No response,

Strategic Drivers for E-commerce



Source: Cahners In-Stat Group

"As organizations begin to apply their business processes and mission-critical data to the Web, they also need to maintain the same level of control and management as the data center has over the same information and systems," Boisvert says. "Host-management functionality has to be built into Web-enabled products, which allows IT departments to control who is allowed to access the systems and specific data and applications within them."

Caddis also emphasizes that "what tends to get lost in there is the focus on customer service. Is an online banking customer happy when he has to navigate through 12 screens, at 25 seconds each, just to get to his balance? The bank that can provide that service in a total of a few seconds has a key differentiator."

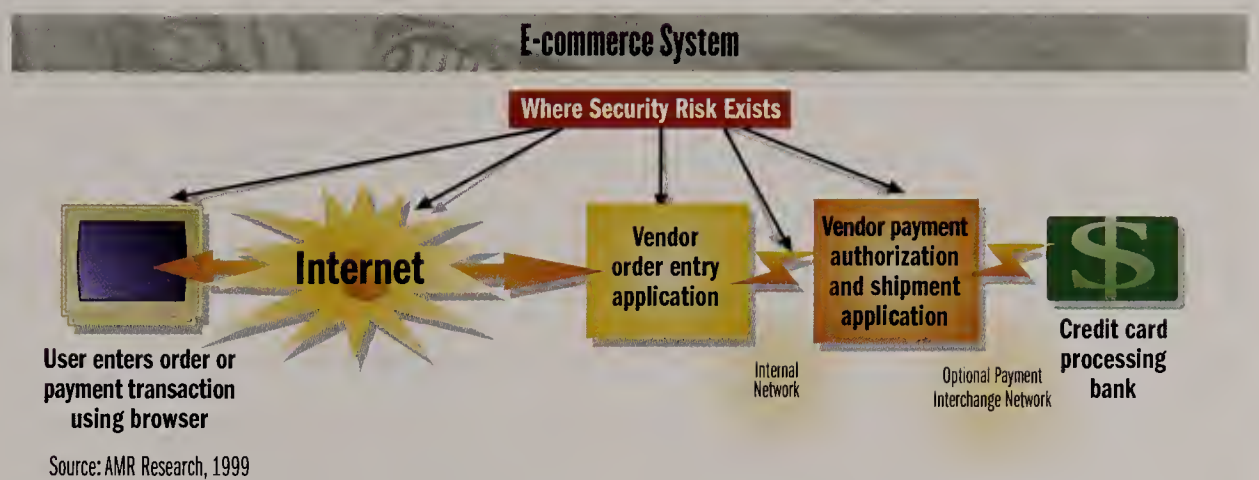
The problem, therefore, is visibility. Companies have very little insight into the quality of electronic customer service. "What e-commerce purveyors need to im-

slow response and goodbye—I'm going to your competitor. "People don't approach the capacity problem from that perspective," he says.

The issue: "In addition to the high-reliability requirements you have throughout your company, you have to have the means to scale. For e-commerce business models, you need to build an infrastructure that is rapidly scalable across the local and wide areas and economically feasible."

The technology that's required for this task is a combination of load balancing and high availability, including "IP-based services—intranet, extranet, Internet services—that can be load-balanced across an array of servers, for the Web, file transfer, secure commerce, streaming media, DNA and mail servers."

The five site killers, Hussey says, are server failure, software failure, content failure, too much traffic and network unavailability. The "high-availability and quality" technology for balancing the loads at all these levels has to be able to monitor and route traffic around server and software failure. And it must protect



against "object not found answers" to customer inquiries by actively querying servers at the application level. It also must set thresholds for acceptable performance, redirecting a query not answered fast enough to other servers until the response time is right.

Yet another technology solution, file replication and synchronization, is required for managing content across globally distributed installations, Hussey says.

Performance Solutions: Completing the Order

Another frustration for e-commerce customers, particularly on the consumer

side, is entering an order and finding out later that the seller has no record of it. It has yet to be entered into the order management system, which means the store is just that: a front. It has not been integrated with the enterprise transaction systems, the lights aren't on and there's no running water.

Ed Callen, vice president of marketing at Intershop, a broad-based e-commerce and Web-to-enterprise solutions company, says this isn't uncommon—even if the vendor has tried. "A major pharmaceutical company we're now working with tried a year ago to link its Web site

KeyCorp Measures the Customer Experience

Cleveland-based KeyCorp, one of the nation's largest financial services companies, is known throughout the industry for offering its customers innovative, world-class services. In September 1998, the company debuted a new nationwide Internet banking service: Key2Your\$+ Internet. The breakthrough service links KeyCorp's branch office banking, telebanking, ATM and computer banking services into a single system that shares account activity among the four channels in real-time. In addition, the new Internet service provides instantaneous access to a customer's account activity, regardless of the type, location or time of the transaction.

"We knew that a customer's online experience would be critical to the success of our e-business services," said Paul Ayres, vice president and manager of Internet services for KeyCorp. "When we tried to find a stan-

dard for what customers expect from their online experience, we realized there wasn't one. So we began setting our own standard."

Looking for a way to measure its customers' online experience, KeyCorp installed Candle Corp.'s ETEWatch software on its internal servers to measure the response time of internal applications that might affect the customer experience. But what it really needed was a noninvasive way to measure application response time from the customers' perspective. When KeyCorp learned that Candle was introducing a new software tool that could do exactly that and more, it quickly signed on as a beta tester.

Available in spring 1999, Candle's eBA™ ServiceMonitor™ allows companies to measure and monitor the response time of Internet applications, such as online banking, buying and customer support, from a customer perspective. Using a Java

applet rather than a "cookie," the monitoring software is initiated when a user enters a Web site and terminated when he leaves the site. Candle's eBA ServiceMonitor gathers information that enables an IT organization to pick apart applications, look at the components, isolate processes that are too lengthy and attack any potential problems.

"We felt that Candle's eBA ServiceMonitor would be a valuable tool to help KeyCorp assess the consumer experience of our Internet banking services, and we were right," says Ayres. "We've already discovered areas where we can improve the response time of certain features. We are excited about the software's potential to help us find ways to improve our Internet applications and processes and provide our customers with a quality online experience. We think eBA ServiceMonitor will help KeyCorp set the standard for online financial services."

for distributor purchases with its ERP system. This was going to supplement a bank of phone operators. Six months later, the system wasn't up, orders had to be printed out and re-keyed," Callen says. "We went in afterward and won the contract. If a company has its ducks in a row, deployment of back-end integration can happen in 30 to 60 days."

His point is that "those that are doing this integration today are the e-commerce leaders in their industries. The average enterprises need to be sure they are getting into bed with a company that has the experience to provide integration

and deployment and the financial strength to remain in business," he says. "When you get into e-commerce, you are on an upgrade path, so you have to make sure your technology vendor will continue to support standards and provide improved performance and scalability."

Fax, EDI Won't Go Away

Another customer-satisfaction issue is delivery, in this case delivery of information in the form the customer wants, according to Max Anouri, president of CommercePath, a producer of servers for high-volume delivery of information

and documents via EDI, fax and e-mail.

Crutchfield's Lebo points out that while those who buy consumer electronics online are very Internet savvy, about 30 percent to 40 percent still prefer to send their orders in by fax when submitting their credit card numbers. Further, companies surveyed in the Cahners In-Stat Group survey said that fax and e-mail will remain major tools for order confirmation.

There are people and applications that require or prefer an exact, unalterable copy of a document or transaction, Anouri says. Companies such as Ralston Purina want to receive all EDI documents as faxes. Lawyers want unalterable copies, not word documents sent to a PC somewhere.

He adds that "difficult-to-get confirmations via e-mail and Web sites drive more volume to our applications. We provide a bulletproof mission-critical, telephone quality system (99 percent uptime). The bottom line is our servers last year handled a billion business documents for our customers."

Age-Old Challenges

New business models may emerge from levels of customer service not possible before electronic commerce. But the customers' needs and the enterprises' identity—who you are, who you want to be—must always be kept on the screen. The challenge is to create a model that fits and changes with that picture.

Definitions of service may be in flux, but the customers' requirements are age-old: high levels of performance (economy, quality and security) and a sustained culture and infrastructure that says trust.

"Creating a Business Model for E-Commerce" is the first in a series of four Strategic Directions Advertising Supplements produced by CIO Custom Publishing. Future supplements will examine trends and customer solutions in Computer Telephony Integration, Knowledge Management and ERP/Supply Chain Management.

For additional information about the supplement program, contact Ellen Romanow, vice president and general manager of Custom Publishing, at eromanow@cio.com or 508 935-4796.

Dunlop Tire Fax-Enables ERP for Purchase-Order Delivery

Dunlop Tire Corp. is a full-line tire supplier dedicated to manufacturing and marketing the world's finest and most technologically advanced passenger, performance, light-truck, medium-truck and motorcycle tires. With headquarters in Buffalo, N.Y., Dunlop has approximately 3,500 employees.

PROBLEM

Several years ago, Dunlop Tire replaced its outdated purchasing system with Oracle Corp.'s ERP Purchasing application, running on an Oracle database. The company also wanted to update its purchase-order processes from a manual procedure—of either mailing or manually faxing POs—to a more automated e-commerce solution that would integrate with its new Oracle system.

"Manually mailing or faxing purchase orders was very time consuming," says Steve Vannier, senior business analyst at Dunlop Tire. "By the time they had printed the orders, stuffed them in envelopes and put postage on the envelopes, our buyers would have already spent one-tenth of each day just mailing the POs."

What was needed, Dunlop concluded, was an electronic document-delivery solution that would enable associates to send faxes directly from the Oracle ERP application.

SOLUTION

According to Vannier, one vendor offered a cost-effective product that would scale to fit Dunlop's needs: CommercePath.

CommercePath fax-enabled Dunlop's Oracle ERP Purchasing application, allowing Dunlop to implement a cost-effective e-commerce solution for its mission-critical purchase-order process. Dunlop associates at the company's three locations now use CommercePath to send faxes from Oracle just as easily as they print from it. CommercePath, which is an NT-based solution, has the ability to process thousands of documents each day. In addition, Dunlop also purchased CommercePath's NetLink workstation module. NetLink provides easy-to-use outbound fax delivery and fax management capabilities directly from Windows applications on the desktop.

Implementing CommercePath has resulted in significant time and cost savings, Vannier says. "Because CommercePath is so dependable and scalable, it's a solution that will continue to serve our purchase-order needs even as the company changes," he notes. "CommercePath performs as advertised."

Oh man...

you mean I could have
been faxing from my
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using an affordable
NT-based fax server

Yes!

And all you would have needed is a CommercePath production fax server. Imagine how nice it would have been to automatically deliver purchase orders, invoices, order acknowledgments and other mission-critical documents directly to your customers and suppliers while avoiding the pain of printing and mailing. And, since CommercePath is already integrated with the leading ERP solutions and is the market leader in production fax, the implementation would have been a snap.

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Choose an award-winning CommercePath server for your ERP applications and every fax machine in the world will become a remote printer directly from whatever ERP applications you're running. And, that same CommercePath server will also create an enterprise fax environment linked to your network, your email and your EDI applications.



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interactive **eBA*ServiceNetwork™**, you increase your knowledge and control of your site as you analyze this information over time. eBA*ServiceMonitor and eBA*ServiceNetwork give you:

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- ▲ Network time
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Trendlines

On Record, Online

INVESTIGATIONS Remember in *Chinatown* when Jack Nicholson's Jake Gittes searches the Hall of Records for real estate transactions to find out who is buying up all the land on the outskirts of Los Angeles? Now picture him instead in his office, feet on his desk, smoking a cigarette, unraveling the same problem in front of a PC. If he comes to Georgia, that easy life can be his.

Georgia's statewide real estate index is now available on the Internet at www.gscca.org. Developed by the Economic Development Institute (EDI) at the Georgia Institute of Technology in Atlanta, the index is accessible to sleuths and businesspeople alike. The Web-based index, launched in January 1999, includes names of sellers and buyers, property locations, property liens, and the book and page where the actual deed is filed in each county. Georgia Tech outsourced the infrastructure work to Intermedia Communications Inc. in Tampa, Fla., and the hardware and software to Cott Systems Inc. in Columbus, Ohio. The system requires the 159 county clerks' offices in Georgia to use a standard entry procedure for real estate data. A frame relay network set up on a TCP/IP protocol allows computers connected to different LANs across



the 159 offices to exchange information directly. John Myers, project director and director for the Center for Public Buildings in EDI, says that all the counties are successfully transmitting files, which are backed up on a central system and monitored around the clock. For the moment, only information dating from Jan. 1, 1999, is available; plans to input data from the past two to three years are in the works. So Jake, come on down to Georgia, where you can keep your nose out of trouble. ■



Watching the People Watchers

FBI FILES Wanna feel like a Fed without leaving the comfort of home? We do sometimes. So we've been spending time in the FBI's Freedom of Information Act Electronic Reading Room (www.fbi.gov). There for the downloading are pages of FBI files divided into tantalizing-sounding categories such as Gangster Era, Violent Crime, Famous People and Unusual Phenomena. The G-men have scanned in the paper versions of oft-requested cases available to the public through the Freedom of Information Act, thus saving the curious but lazy among us the trip to FBI headquarters in D.C. (warning: the paper copies weren't always pristine, so don't blame your computer or your optometrist if you find them hard to read). Sample tidbits from the files of the famous: In the House Un-American Activities hearings in 1953, it was found that Lucille Ball registered to vote as a Communist in 1936 at her grandfather's insistence. The complete 142-page file is available for public perusal, as is the 391-page record of the investigation into Errol Flynn's alleged involvement in the white slave trade, among others. And they were certainly busy tracking Ol' Blue Eyes—the 1,275-page Frank Sinatra docket is filled with information about his supposed Mob ties, a bribery allegation (that was disproved) and the record of his arrest in New Jersey on seduction and adultery charges. ■

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Trendlines

Selecting Sites Unseen

Y2K DISCLOSURES A host of Web sites has sprung up in the past couple of years to give anxious stockholders (and nosy competitors) the scoop on companies' Y2K compliance progress. With so many places to find disclosure statements, how does a time-strapped Web surfer know where to go first? Fortunately, the people at Y2KR.com have done some upfront work to simplify the journey, believing that "one should not have to suffer 'surfer's confusion' when trying to find a centralized location to get Y2K disclosure information." Its frequently updated chart rates, on a scale of 1 to 10, the quality of data, the look and feel of the site and whether it is a "must see" or a "don't bother." Y2KR immodestly rates itself a 10 across the board, so perhaps one need go no further, but the chart generously provides links to the other sites as well should you choose to use a lesser service. To check out the complete ratings or to use Y2KR's own search engine, visit www.y2kr.com. ■

“The current cacophony of independent gadgets and appliances will evolve into a seamless society of intelligent mechanisms.”

—Nicholas Negroponte

Negroponte is director of the MIT Media Lab in Cambridge, Mass., which received \$5 million from Motorola Inc. in March 1999 to create what it calls a DigitalDNA Lab. The plan is to develop smart products that not only will anticipate a user's wishes but will communicate those wishes to each other.

Findings IT Spending

Where the Jobs Are

CIOs looking to set new personal and professional goals as the century turns are finding plenty of opportunities to do so. Of the 10 hottest executive jobs identified this year by Christian & Timbers, a Cleveland-based recruiting firm, all but one require a fairly high level of IT expertise.

The recruiter came up with the list based on data about the executives they've placed with their clients, such as their company's direction and priorities. Christian & Timbers offers services in seven broad practice areas: financial services, consumer products, life sciences, professional services, energy, industry and technology. As most of these areas aren't specifically IT-related, the heavy tech slant is especially striking.

Here are the top 10 jobs for which C&T says demand is increasing most markedly, along with the percentage of projected growth through 1999:

1. E-commerce CFO (+158%)

This position will be hot in pre-IPO (initial public offering) companies that are starting to generate revenue and brand recognition. Says C&T's report, "The demand for this professional reflects a diverse array of companies that, anticipating an IPO, want to position themselves to take advantage of the IPO 'gold rush.'" Qualified candidates must possess experience in taking a company public—knowing the mechanics of the IPO process—and solid overall business skills.

2. Internet CEO (+133%)

"This individual will be invaluable to the company that is beyond early-stage startup," reports C&T. "The company will have strong venture capital funding and may or may not have gone public." It will also still have its original entrepreneurial CEO—likely an individual who recognizes that he or she does not possess the requisite background to further expand the company and wants to move to the boardroom to make room for someone who does.

3. Chief Technology Officer (+119%)

The CTO must understand his or her company's current and future technology requirements and be able to think of products in relation to technology and implications for the future. "Tomorrow's CTO must possess a hard-to-find combination of business savvy, technological know-how and vision," says the report.

4. Vice President of E-commerce (+108%)

5. Merger and Acquisition Investment Banker (+87%)

6. Year 2000 Consultant (+82%)

7. Vice President, Online Community (+76%)

8. CEO, Network Integration Services (+61%)

9. Vice President of Data Warehousing (+58%)

10. New Generation Vice President of Human Resources (+51%)

The complete study, which also lists the 10 executive positions in most precipitous decline (top among them: vice president of retail operations and vice president of government sales), is posted on Christian & Timbers' Web site at www.ctnet.com.

—David Pearson

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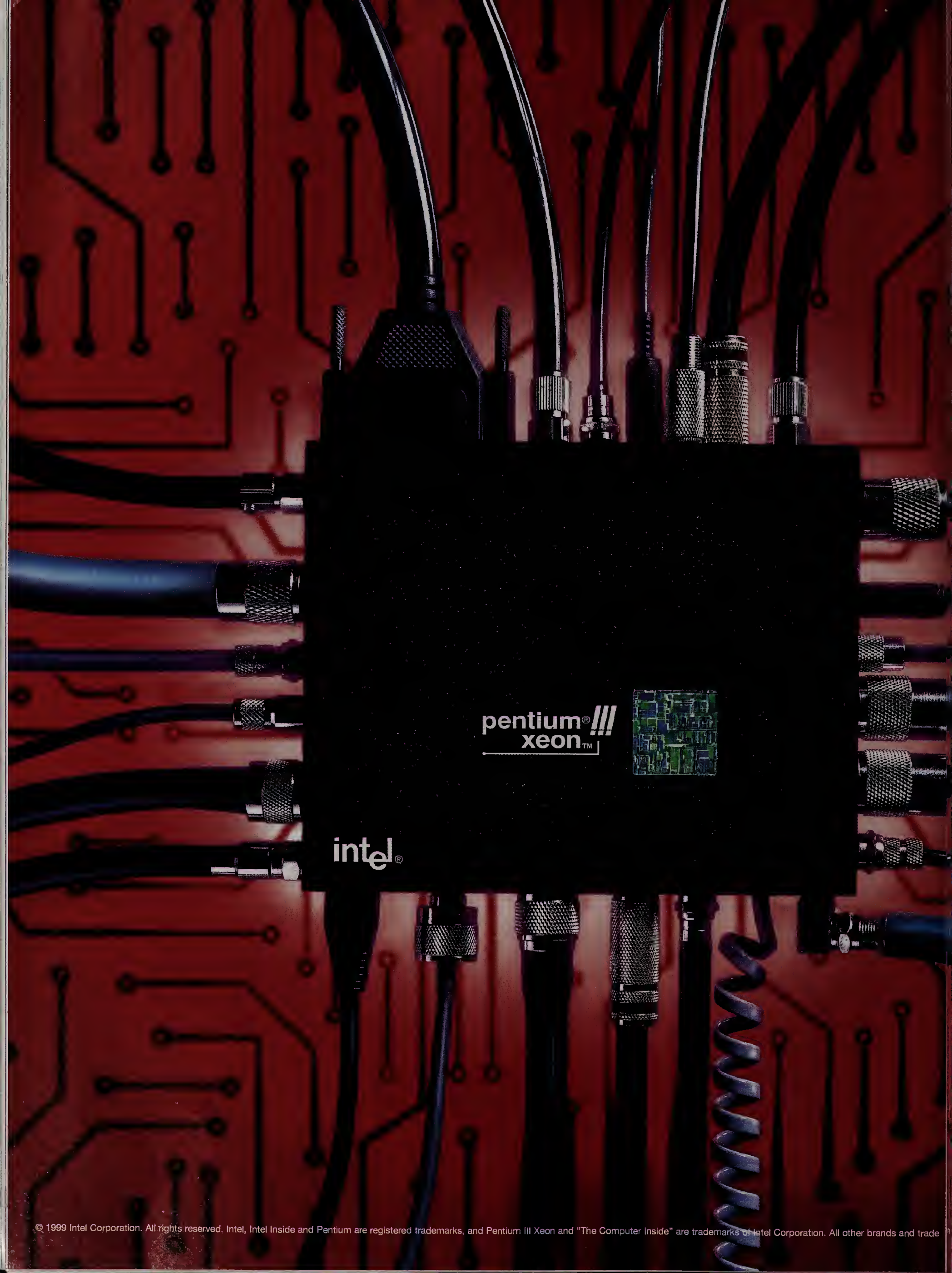


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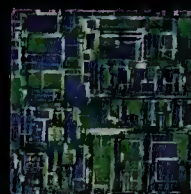
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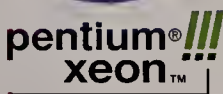
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HR and IT in Wedded Bliss

For better or for worse, this unlikely partnership could form a lasting relationship

BY TOM DAVENPORT

FLOWERS, RICE, MENDELSSOHN, cake. It's a shotgun wedding between the information technology and human resources functions. Neither party is sure it wants to tie the knot with the other, but they have no choice. In this case, they are being brought together by a powerful weapon called learning technologies.

Let's review the lineage of these two families. HR is the home of the people people—those helpful individuals whose job it is to assist in recruiting, compensating, evaluating, retaining and eventually removing people from organizations. IT, on the other hand, is focused on machines—procuring, installing, programming, maintaining and eventually unplugging them. On the surface, you couldn't find a less likely set of partners.

In some ways, however, HR and IT have a lot in common. HR uses machines to manage people and IT uses people to manage machines, and both have to deal with a mixture of the two worlds. Both are staff functions and enjoy relatively low regard within the organization; when they get together, they can console each other. Perhaps their reputation problems are based on the fact that both are responsible for something (people and technology/information) that is really too big, too pervasive and too important for a single business func-

tion to address. HR and IT have so many similarities that my old boss Jim Champy (this was in his pre-guru stage) once read an article by Peter Drucker called "Goodbye to the Old Personnel Function" to a conference of IT managers, and the audience thought he was reading about IT.

There have also long been similarities between these two groups on the information transaction side. Now, you know what interest the IT organization has in information transactions, but you may not realize that HR is hardly a stranger to transaction processing. The first IT application in business was, after all, payroll (way back in 1953). Some pretty large companies, including PeopleSoft Inc., made their mark in HR transaction systems. A very large group of people work on HR transactions systems; they even have their own association, the International Association for Human Resource Information Management, with tens of thousands of mem-

bers. Dave Ulrich, a University of Michigan professor and HR expert, argues that HR functions don't win the right to address higher-order issues unless they have first gotten the transactions correct. Of course, the same might be said about IT.

But neither HR nor IT are solely concerned solely with transactions. HR, in addition to being on the line to ensure that you get paid and are charged the right amount for dental insurance, is supposed to develop new skills and expertise among employees. Forward-thinking HR people, who generally resided in something called management development within the function, began to get excited about a concept called organizational learning (OL). Many of them became

devotees of Peter Senge and his mysterious-sounding book, *The Fifth Discipline: The Art and Practice of the Learning Organization* (Currency/Doubleday, 1994), full of esoteric

concepts such as systems thinking and personal mastery.

The OL movement was an upscaling breath of fresh air compared with running a bunch of training courses at the local hotel (so much so that many HR people, according to my friend, Jenifer Lippincott, who is director of business development at Consultec, now refuse to use the "T" word). The only problem is that these noble ideas proved to be difficult to implement on a large scale. HR people were left with a desire to radically upgrade employee learning, but the OL movement



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didn't specify the tools that would make it feasible.

The good old IT function has worked for the last four decades or so to provide lots of transaction data for the organization. It has largely succeeded in its mission—to such a degree that now most people have far more data than they can manage. Increasingly, it is becoming apparent that if no one is actually informed by or learns from the information provided over the IT infrastructure, then there's not much point to the whole endeavor. IT people have, over the past couple of years, been jazzed about a concept called knowledge management, in which information technologies have been harnessed for the purpose of helping knowledge workers do their jobs. They build repositories of knowledge and value-added forms of information. But how do you ensure that people actually receive value—perhaps even learn—from the knowledge embedded in Web sites and Notes databases? Some argue that knowledge management has stalled because senior managers find it difficult to determine its value and its relationship to improved performance.

The Urge to Merge

Clearly, both HR and IT have moved beyond transactions to focus on such highfalutin' concerns as knowledge and learning. Just as clearly, both face critical challenges in converting these concepts into improved human and organizational performance. They're both in the church, but the preacher, the vows and the compelling urge to merge are missing.

Ah, here's the preacher: It's Gloria Gery, a pleasant-looking cleric with a strong following among the "integrated performance support" faithful. She's been giving sermons on the topic for more than a decade; the bible of the movement is her book *Electronic Performance Support System* (originally from Digital Equipment Press but for obvious reasons now offered by Gery Associates). As explained to me by Phil Tierney, a Gery devotee at Intel who designs performance support systems at Intel Corp. and who also forswears the

"T" word, the concept requires technology to support learning on the job at the time when the learner needs it. The learning should not remove the learner from the business transaction but should be integrated with it through the system interface. The knowledge presented to the learner must be appropriate to the task and the worker. Gery is strict about these vows and will demand that any pairing of HR and IT adhere to them.

However, performance support has been around for a while and hasn't led HR and IT to the altar. Perhaps it's

Increasingly, it is becoming apparent that if no one is actually informed by or learns from the information provided over the IT infrastructure, then there's not much point to the whole endeavor.

because the concept has been applied primarily to transaction rather than to knowledge work. Gery and performance support advocates have railed, for example, against technologies that cover up the transaction screen to deliver learning. This is a real concern with transaction work, but knowledge workers—a group that is surely growing in our companies and societies—need learning too, and they may not even have transaction systems on their computer screens.

The real shotgun for this marriage is what Lippincott calls learning technology infrastructures—typically Web-based platforms that contain a variety of knowledge types. These infrastructures might include performance support systems that are closely integrated with the job but could also incorporate reference information, product specifications, customer knowledge and so on. This latter sort of online knowledge is extrinsic to the job and the transaction system and thus, anathema to performance support purists. But for knowledge workers, who are used to searching widely for knowledge and occasionally have a few moments to reflect on their learnings, an extrinsic knowledge delivery system may not be so problematic. Both Tierney and Lippincott respect Gery's work and took the vows of performance support, but like others who are attempting to work out the marriage

of HR and IT on a daily basis, they've relaxed some of the vows in practice (as in my own marriage, where my wife always loves me, occasionally honors me, but seldom, if ever, obeys me—come to think of it, she edited that last word out of her vows).

At first glance, some of these Web-based learning infrastructures look a lot like knowledge management systems. They contain the same types of knowledge content and have similar search and retrieval capabilities. They may even involve some personalization and push

capabilities. The difference between these learning technologies and most knowledge management applications, however, is that the former are designed with reference to a particular

job or set of jobs. They may not be as tightly integrated with the job as traditional performance support systems are, but they are almost always built to support a specific business process.

Saying "I Do"

If the IT half of the marriage (probably the groom, since IT departments are disproportionately male) brought new tools and a strong interest in knowledge management, the HR half (more likely statistically to be the bride) brought a strong orientation to improving job performance and a focus on knowledge use. Knowledge managers, and the IT profession more broadly, have often attempted to put as much knowledge into repositories as possible, without regard to how the knowledge will be used in the context of particular jobs. As a result, the repositories don't support any particular job very well. Performance support's emphasis on particular job contexts and knowledge management's reliance on knowledge workers and a wide variety of learning objects make for a healthy, diverse relationship.

So these two functions are joined in holy matrimony until death do them part. They've merged to such a degree that it's often difficult to tell which camp particular practitioners came from. Lippincott works with IT people, HR people and business sponsors to sell and deliver

these systems. Although Tierney's background is in the "T" word and performance support, he's now part of an IT group at Intel that's developing knowledge delivery systems for the company's SAP R/3 implementation. At recent knowledge management conferences, I've heard people from IT functions speaking about organizational learning and performance support and I've heard people from HR functions advocating knowledge repositories and intranets. CIOs talk to me about learning, and chief learning officers talk to me about knowledge management and technology.

Like all marriages, however (except mine, of course), there are occasional setbacks. The IT world, for example, is buzzing with enthusiasm about corporate portals—one-stop shopping destinations for all information and knowledge content within the organization. This idea seems to have worked pretty well on the Internet; billions of dollars in market value for companies like Yahoo Inc. and

Lycos Inc. tell the story. But I think it's a bad idea for internal corporate applications. It's the knowledge management fallacy run amok; there is nothing resem-

**If IT brings a strong
interest in knowledge
management to the union,
HR brings a focus on
knowledge use.**

bling a specific job context for the application of portal-based knowledge. It's one-size-fits-all knowledge delivery. Let's hope that IT's better half, the HR/OL/performance support crowd, kills this idea before it goes too far.

There are also going to be persistent communication issues. IT is from Mars, HR is from Venus, and so forth. Many IT people will prattle on about Web sites,

intranets, and access to information and knowledge. Most HR people will prefer terms like performance support, human performance and organizational learning. Good HR-IT hybrids will have to be "semantic integrators," attempting to communicate in terms the other side understands and eventually creating a language that's appealing to both.

The progeny of this marriage will be the real HR/IT hybrids. Future generations will draw from the best features of organizational learning, IT infrastructures, performance support and knowledge management, and their hybrid vigor will dramatically improve organizational and individual performance. **CIO**

Thomas H. Davenport is a professor of management information systems at Boston University School of Management and director of the Andersen Consulting Institute for Strategic Change. He welcomes reader comments at thomas.h.davenport@ac.com.

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*Timberland VP of IS Yusef Akyuz
urges CIOs to look beyond the
immediate needs of the business.*

The Hidden Costs of Data Integration

Nothing eats time or blows budgets like a runaway data integration project. Here are seven tips to help protect your investment.

BY DAVID PEARSON

A LOT OF I.T. ORGANIZATIONS HAVE INTEGRATED A LOT OF DATA AND IN THE process shelled out a lot of money. Too much? Maybe so, judging from the comments of several CIOs who've recently been through major integration projects. Business plans. Data transfer. Project leadership and user training. Each of these devils has risen up from the details of integration projects and bitten CIOs squarely in the back pocket. Now perhaps these IS executives weren't fully abreast of the latest and greatest integration tools on the market. Or maybe there are just so many different ways to integrate data and thus so many ways to fumble the project management fundamentals common to any IT initiative.

Either way, integration has clearly become a basic block-and-tackle endeavor for many organizations—a low-profile service that user groups and senior management have come to take for granted. Even some CIOs are tempted to delegate or outsource data integration, then walk away until the work is finished.

In other words, it's a project waiting to bloat.

The Bottom(less) Line

At its most basic, data integration is whatever set of processes takes place when two applications built by different developers exchange information. This process almost always involves four steps: extraction, transport, transformation and loading.

Reader ROI

DATA INTEGRATION IS ALL about new operating efficiencies and improved business processes—neither of which comes cheap. Integration projects are also prone to run-on expenses in unexpected, or hidden, areas. Here you'll learn about those hidden costs and how to avoid them.

COVER STORY: DATA MANAGEMENT

One might have a separate program to perform each of these functions, or one might instead be among the growing legions who invest in message-brokering software that can automatically manage all aspects of the data flow, from broad business considerations to discrete technical minutiae. One might also be implementing an enterprise resource planning (ERP) solution and looking for that to solve all the integration headaches (if that's you, don't hold your breath), or be somewhere in between—either using some combination of two or three tools or a partial message-brokering solution (see “Message Brokering: Plan Today or Pay Tomorrow,” below).

No matter the approach, some things can be done upfront to keep unnecessary costs from turning integration projects into a money pit.

For starters, recognize that it takes more than a software installation to integrate data successfully and cost-efficiently. Message brokering, for example, like most software marketed as a complete solution, requires development and ongoing management by humans, which often means investment in additional software tools for such tasks as code management, version control and customization of transformation adapters.

And don't forget: It may not sound expensive to say you have to figure out what data is needed, how to convert it and how to clean it up so that it can be loaded into new applications. But data integration remains, for many, a difficult and costly task.

So what *should* integration cost? Obviously the dollar figure varies widely, from a few thousand dollars for basic data extraction to millions for a full message-broker-plus-tools complement. And one must also take into account that integration isn't necessarily an isolated project; it has a ripple effect across systems, often creating new pseudo-applications. “They're applications that sit between your existing applications,” says Ross Altman, a research director in GartnerGroup Inc.'s applications, integration and middleware strategies service in Stamford, Conn. “They're slightly different in style and architecture, but they're definitely applications.” And building applications requires a development environment, training, process definitions, architecture—all the things that you'd associate with any other development project. “Most people don't realize that,” warns Altman. “They just think it's a matter of stitching together databases. And then those stitchings end up becoming mission-critical.”

What else can one do to keep an integration project's cost contained? Here are seven “gotchas” identified by CIOs.

Tip No. 1

Business Objectives: Nail Them Upfront or Get Nailed Later

A VERY THOROUGH understanding of the whole information flow is critical as a starting point, says Yusef Akyuz, vice president of information services for The Timberland Co., the rugged shoe and apparel maker in Stratham, N.H. He oversaw a considerable investment in IBM Corp.'s MQSeries message-brokering software. He then set out to customize the flow of information using the IBM software so that different computing platforms and applications were invisible to business users. His goal: Use the installation pro-

cess as an opportunity to reengineer business processes so that people wouldn't simply be transferring files but rather everything needed to perform particular functions more efficiently.

“You can pick and choose the information coming across [using message brokering] and tailor it toward the destination it's going to, but if you don't have the big picture in mind, what good would that be?” Akyuz asks. “One should not look at what is needed today, but one, two, three years ahead.”

And then the focus should not only be on interfacing but on the entire supply chain function. “Think ahead,” says Akyuz. “How can different departments benefit from other departments' data?”

Tip No. 2

Weak Project Specs Will Blow More Than Your Budget

NAIL DOWN SPECIFICS on data sources and targets, including what needs to be moved and how it will be used—or else prepare to pay more later, when you're doing the data mapping you should have done upfront.

“You don't want to spend an inordinate amount of time somewhere in the middle of the project trying to specify what it is you really need to chew off,” says Ashwin Rangan, senior vice president and CIO of Conexant Systems Inc., a semiconductor maker in Newport Beach, Calif. He learned his lessons when he set out to supply the company's sales staff with data from an SAP billing system.

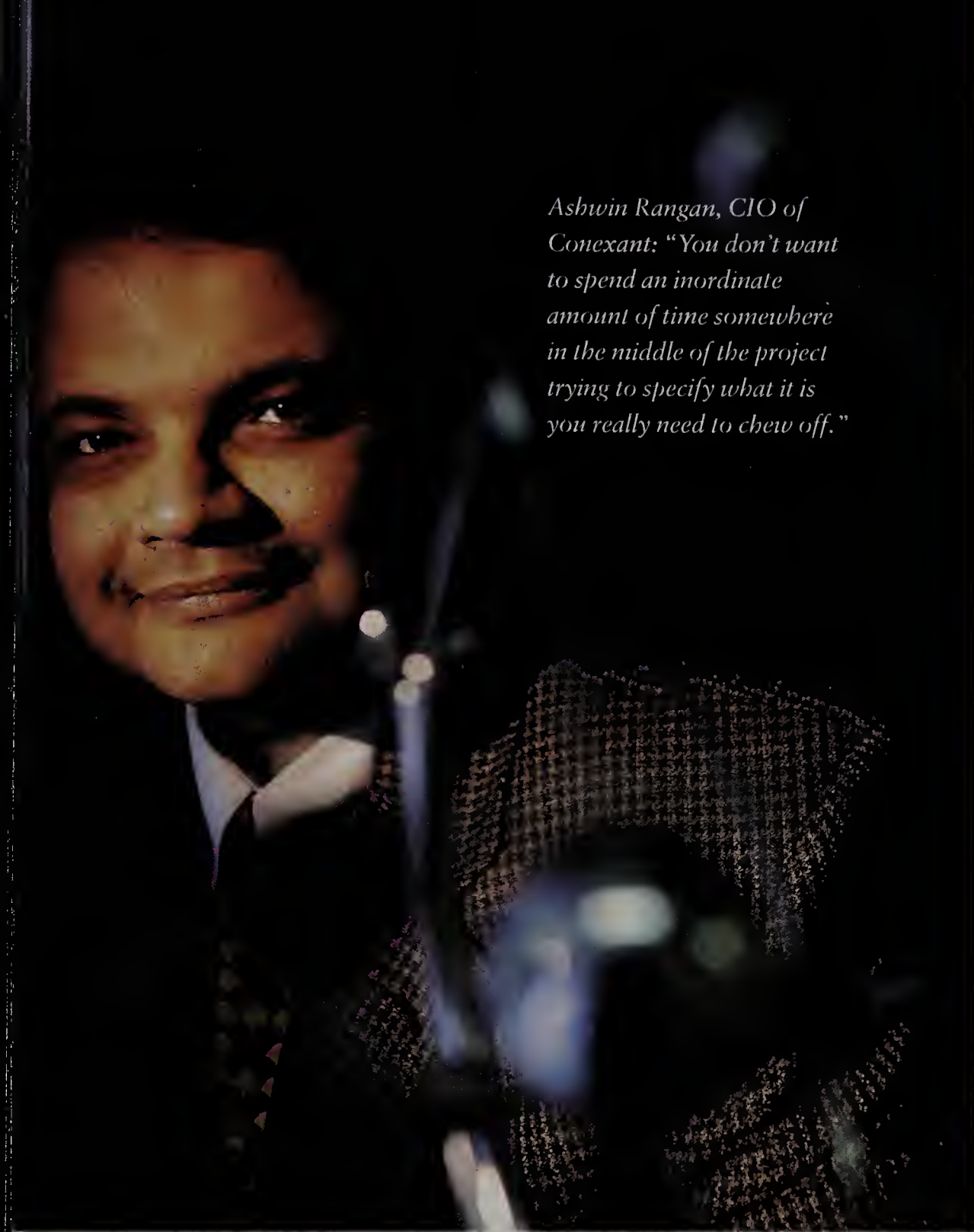
Often, Rangan found, when IT people look at integration projects, their focus tends to be on the technology—particularly the middle layer that permits two discrete systems to talk to one another. But in the long run, that is a secondary consideration. The primary question is, Why does the business want a pipeline between these two systems? “Oftentimes that question is never asked, let alone answered,” says Rangan.

Messaging and middleware is a very complex set of technologies—and a nontrivial investment of time, energy and

Message Brokering: Plan Today or Pay Tomorrow

*The same old integration issues
apply to new-wave EAI tools*

FOR MOST I.T. ORGANIZATIONS, INTEGRATING APPLICATIONS by simply batching and transferring files is no problem—that's what they've done for a long time. But taking advantage of the new message-brokering products on the market, also called enterprise application integration tools (EAI), which allow integration on a more real-time basis, means reckoning with



Ashwin Rangan, CIO of Conexant: "You don't want to spend an inordinate amount of time somewhere in the middle of the project trying to specify what it is you really need to chew off."

goes beyond the project itself because it's the credibility of the organization and the people that get put at stake. You can't put a dollar figure on integrity. Losing it is an unbearable cost."

Tip No. 3 Most Data Is Dirtier Than You Think

CLEANSING DATA of redundancies and irrelevancies so that it can be moved efficiently from a source system to a target system is time-consuming and costly. Yet people continue to be optimistic on the front end, setting themselves up for creeping costs as the integration project moves along, according to John Carrow, CIO of Unisys Corp. in Blue Bell, Pa., and former CIO of the city of Philadelphia. "It almost always ends up taking a brute-force, intensive, manual data-entry effort to sort out the data," says Carrow. "It's common to optimistically assume that data is clean, but that's usually a very bad and costly assumption."

Carrow also points out that off-the-shelf products have made it easy to provide the right kinds of interfaces for moving data once it is clean. "But doggone if it isn't still one of those things where, despite the fact that it's been focused on across many industries and businesses, you've still got to ask yourself, Have we been thorough enough in defining the interfaces? Do we really understand everything that has to be converted? And have we sized it right in terms of what it's going to take to do that?"

money. If you forge ahead without measurable mileposts and a firm plan, your integration project will become an IT initiative, not a business initiative. "The hurt in that kind of mistake

enough in defining the interfaces? Do we really understand everything that has to be converted? And have we sized it right in terms of what it's going to take to do that?"

some of the same old issues.

Doing messaging right begins with retraining staff and understanding that the program may not be as complete as you'd like right out of the box, according to Ross Altman, a research director in GartnerGroup Inc.'s applications, integration and middleware strategies service.

"In many cases, you're going to have to buy third-party management and performance monitoring tools in order to get some real control over this potentially broadly distributed implementation," Altman says. "I think a lot of people are surprised by the ongoing management requirements that messaging brings."

Other items that might run up your integration bill when you go the EAI route:

■ **EAI Tools.** They reduce the amount of time and effort it takes to build your application, but they don't make the work go away. "You still have to figure out the business semantics of the source and target applications," says

Altman. "What does the data look like? What are the business rules that apply to that data?"

■ **Preparation.** EAI doesn't negate the need to do some analysis and design work. "Somebody's going to have to sit in a conference room and put a lot of flip-chart pages on the wall before they're ready to use the EAI tool that they bought," says Altman. "That cost tends to get overlooked."

■ **Management.** The best EAI tools have built-in code-management, version control, impact analysis and configuration-creation components. But they still have to be managed by a living, breathing human being. "No matter how you choose to do it, integrating systems and applications effectively takes a dedicated team," says Altman. "And the team has to include developers, project leaders, business-process experts, and systems and administration people. In other words, you can't get there on the cheap."

—D. Pearson

Tip No. 4 Once Is Never Enough

ACCORDING TO Conexant's Rangan, it pays to take a snapshot of the data to be transformed and hang onto it for the duration of the integration project. Integration bridges are built under certain assumptions, and those assumptions are likely to change over time. If you don't freeze the data, you may later need to go back to the design phase to make it transferable.

In the process of deploying its new sales-force automation tool, Conexant wanted to dig data out of an SAP billing system in a different environment. It was a case of different technologies, products and platforms—one was client/server, the other a replicated Notes database. "Just before we got to the point of cutover, we found that we had to do one more wash [because some of the data formats had changed]," he says. "It was one of those gotcha moments."

Rangan's group referred back to the design cycle, took another look at the information sources being dug out for sales and rewashed it. "The second scrub is usually easier because you've already been down the path once," he says. "And it's not as difficult to go down the path a second or subsequent times. Nonetheless, it is a delay in the overall integration process."

Tip No. 5 Take Charge of Project Management

TOO MANY COOKS in the kitchen can indeed spoil the integration broth, says Lauris Ann Nance, CIO of the Public Service Co. of North Carolina Inc., a natural gas supplier based in Gastonia. Nance's 60-person IT group was charged with integrating financial and HR applications from a PeopleSoft Inc. ERP package with a materials-management package from American Software Inc. and with a legacy customer information system that also needed Y2K compliance



Lauris Ann Nance, CIO at a natural gas company: Take charge of bickering vendors.

work. That meant there were many opinions on whose methodologies would rule the day. Such a situation may or may not ring up financial expenses, but who wants to pay even the nonmonetary costs incurred by a cloud of "who's in charge?" tension hanging over a workforce every day?

"On the pro side, our people learned the importance of having strong project management capabilities in-house," she says. "But in the future, we'll size up consultants on how well they'll fit with us before we bring them in based almost exclusively on their technical skills."

Tip No. 6 Monitor Transmissions to Avoid Fatal Bottlenecks

END-OF-MONTH INCREASES in integration activity, such as regular billings or salespeople rushing to meet quotas, can fill a messaging system to its capacity, slowing down transfers and backing up business processes. At Timberland, Akyuz used to have IT resources dedicated to monitoring data transmissions, segmenting large transmissions into many smaller ones. IBM's MQSeries software and a transmission monitoring application that Timberland developed alert staff to problems early on or as they happen and automatically retry stalled transformations. Akyuz is also in the process of procuring a pricey object-oriented middleware solution for integration, which, along with MQSeries, will segregate and send information to different locations, regardless of hardware platform, application, time zone or language.

On Our Web Site

cio.com

For More on Integration

The Integration Backlash

A three-part series in the Nov. 15, 1996, and Dec. 1, 1996, issues.

Will the Message Get Through This Year?

A column in Section 1 of the March 1, 1998, issue.

All four of these articles as well as the complete CIO archives can be found at www.cio.com/archive/indexfront.html.

Akyuz offers a word on monitoring: Even if you've invested in a comprehensive messaging solution, you may need to spend a little more to obtain automated monitoring capabilities—from either the messaging vendor or a third party. Otherwise you may not know there's a problem with a transmittal until it's created a backlog; nor could you assume that there'll be an automatic retry if the transmission stops midstream. Most messaging vendors offer monitoring tools as expensive options. If you do go with monitoring tools, make sure they work with all the different computing platforms your enterprise uses.

Tip No. 7 Don't Forget Training and Support

NOT ONLY DOES DATA RESIDE in any number of disparate sources, but it also often gets accessed with any number of interfaces. It's impractical to support integrated architectures with several specialists, so you need individual staff members with a broad range of skills. Naturally, that means training—of users and IT pros alike.

If you don't have the skills in-house to provide user training, you'll need to hire someone to do it. Plus you'll need to fork over sufficient funds for the creation of printed training materials—and of some marketing tools to sell people on

what's in it for them. "These are soft costs," says Charlie Lacefield, former vice president and executive director of business processes and IT at Dow Corning Corp. in Auburn, Mich., who retired just after completing a multimillion-dollar ERP implementation at the chemical-products company. "They're very hard to budget for because it's so difficult to gauge how much it's going to take." He adds that so far there's been no need for additional investment in integration-specific tools to complement the ERP implementation since Dow Corning went with the full suite of SAP modules.

As for the trainers, Lacefield favors technicians with good communication skills, never general educators with only a rote understanding of technology. Naturally, finding qualified trainers can be a job in itself for a member of the IT team; the same can be said of coordinating training schedules.

"If people are going to need to adapt to new ways of doing their jobs in order for your integration project to work, not only are you going to have to train them, but you'll also have to hold their hands," says Lacefield. "You have to keep reminding people that they're part of a big team. That's where you get into T-shirts, coffee mugs, mouse pads. Briefcases worked well for us. The more you give, the more you get back. And the cost to do it right is not incidental." **CIO**

Senior Writer David Pearson can be reached via e-mail at dpearson@cio.com.

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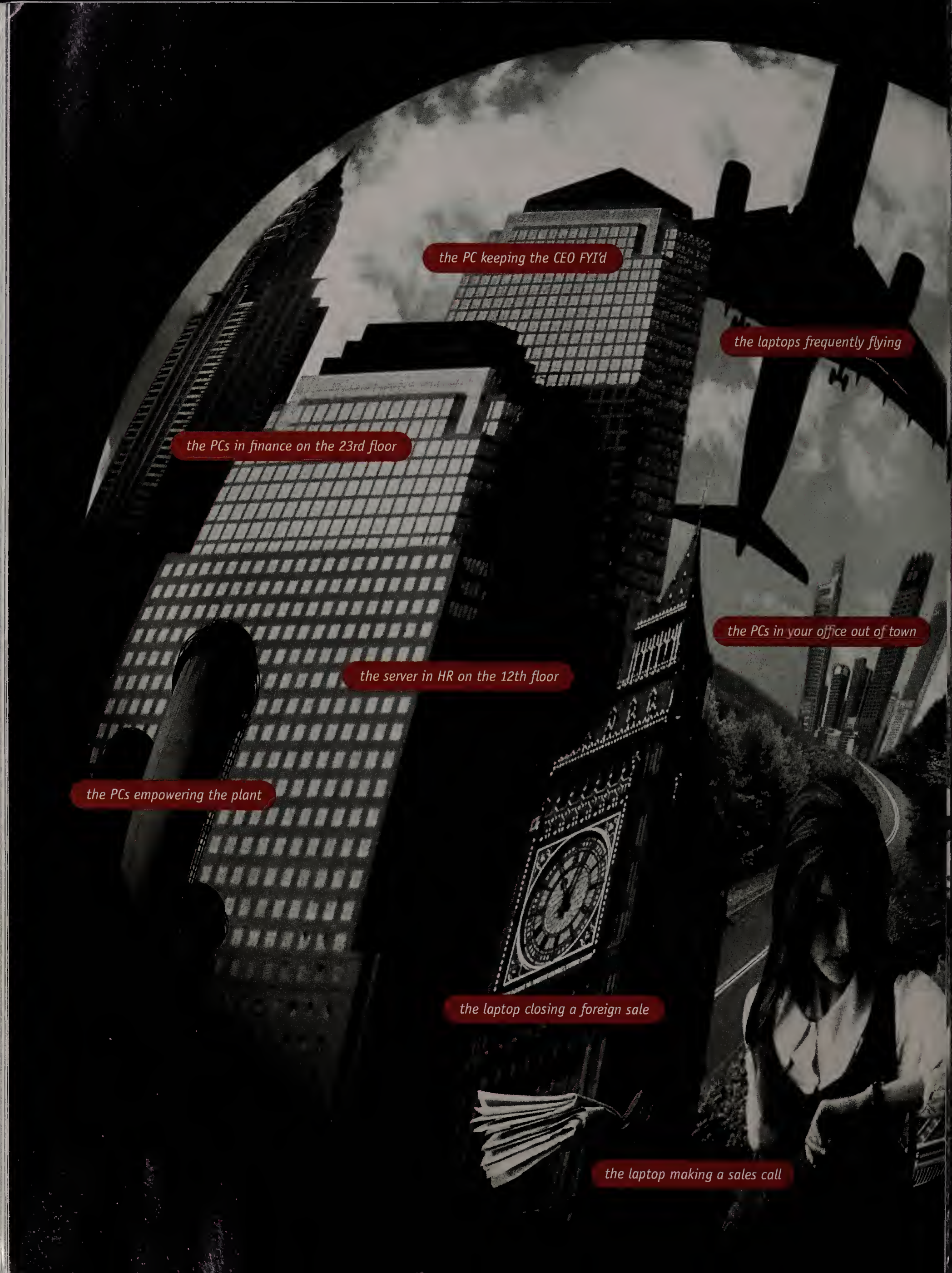
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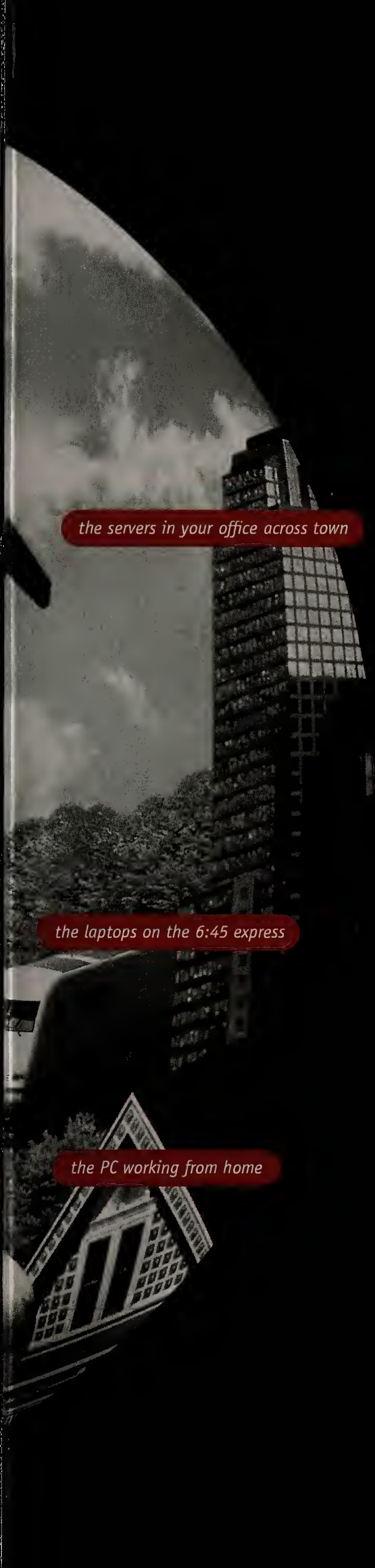
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IT Builds Its Dream House

TEXT BY DAVID PEARSON / ILLUSTRATIONS BY ALBERT LORENZ STUDIO

What kind of building would a CIO build
if a CIO could build a building?

If you've ever had to knock out a wall or tear up a floor just to upgrade cables or expand a network, you know what it's like to work in an IT-unfriendly building.

And that's true of most CIOs because the vast majority of commercial buildings were erected sometime in antiquity—or at least in one or another phase of the pre-client/server computing age. In fact, even in new facilities, a lot stands in the way of optimal IT performance. All because no one ever thought to ask an IT executive what physical features would help his or her organization support the enterprise to the very best of its abilities.

Well, now someone's asked. While CIO can't rush out and build an IT-friendly building, we can offer a blueprint as envisioned by a

Reader ROI

DON'T RUSH INTO A CONSTRUCTION or renovation project before you consider what physical characteristics

- ▶ Best support IT staff
- ▶ Optimize efficiency in maintaining hardware and infrastructure
- ▶ Ensure flexibility to allow for changing uses of static spaces

number of IT executives who've recently been through a major building or renovation project. Their input led us to compile a composite wish list and have it illustrated by the Albert

Lorenz Studio. We'd also like to thank Lewis Goetz, CEO and principal of Greenwell Goetz Architects of Washington, D.C., for his insights during the course of this project.

In all likelihood, you won't be able to take this information and start planning your dream building tomorrow any more than we could. But the exercise ought to help folks who plan to—or hope to—renovate soon.

In approaching this project, we took into account the fact that many companies are moving toward a virtual-facility model, in which staff members work from home or on the road and "enter" the corporate quarters only through teleconferencing technology or e-mail.

Based largely on that key requirement as well as on other IT-related activities going on in the halls of corporate America right now, here's the building of a CIO's dreams in two parts—one relating to human resources, the other to technological resources.

Senior Writer David Pearson can be reached at dpearson@cio.com.

Continued on Page 48

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Housing Humans

A Staff's Workspace Is Its Castle

2 Study zone. What's an IT-friendly building without a well-stocked technical library? It's got to provide plenty of quiet space, house training videos and technical manuals, and offer Internet access and interactive learning tools.

THE I.T.-FRIENDLY BUILDING fosters an open culture, both within IT and between IT and other departments. One way to do this is by keeping open spaces open—and flexible to reconfiguration. How to solve the ambient-noise problem created by large spaces without sacrificing openness? One answer might be glass partitions instead of walls around permanent enclosures such as conference rooms. The overarching idea is to get IT people, so often hidden behind their work, seen—and appreciated—by the rest of the organization.

Also, any office worker will tell you that people in buildings are going to complain about climate, lighting and noise no matter what you do. You can't please everyone, but you can configure a "smart" building in which computerization customizes localized areas for comfort. Assume that capability throughout the dream house.

Aesthetics matter. The way people feel about the place in which they work has a great effect on the quality of work they do. Or, as researchers at the International Workplace Studies Program at Cornell University in Ithaca, N.Y., put it, "The quintessential office cannot be created without simultaneously designing physical, technical, social and organizational systems that are in harmony."

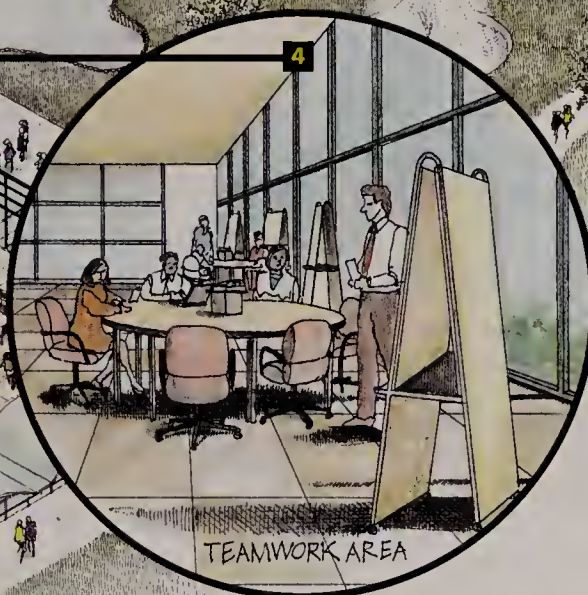
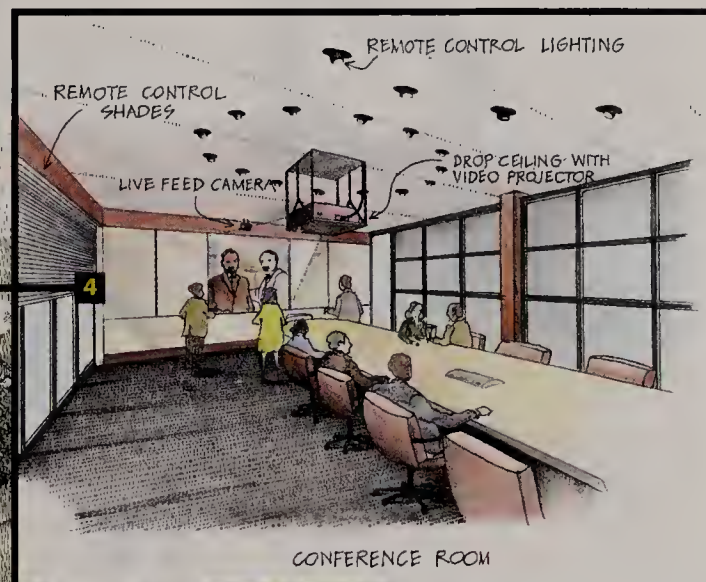
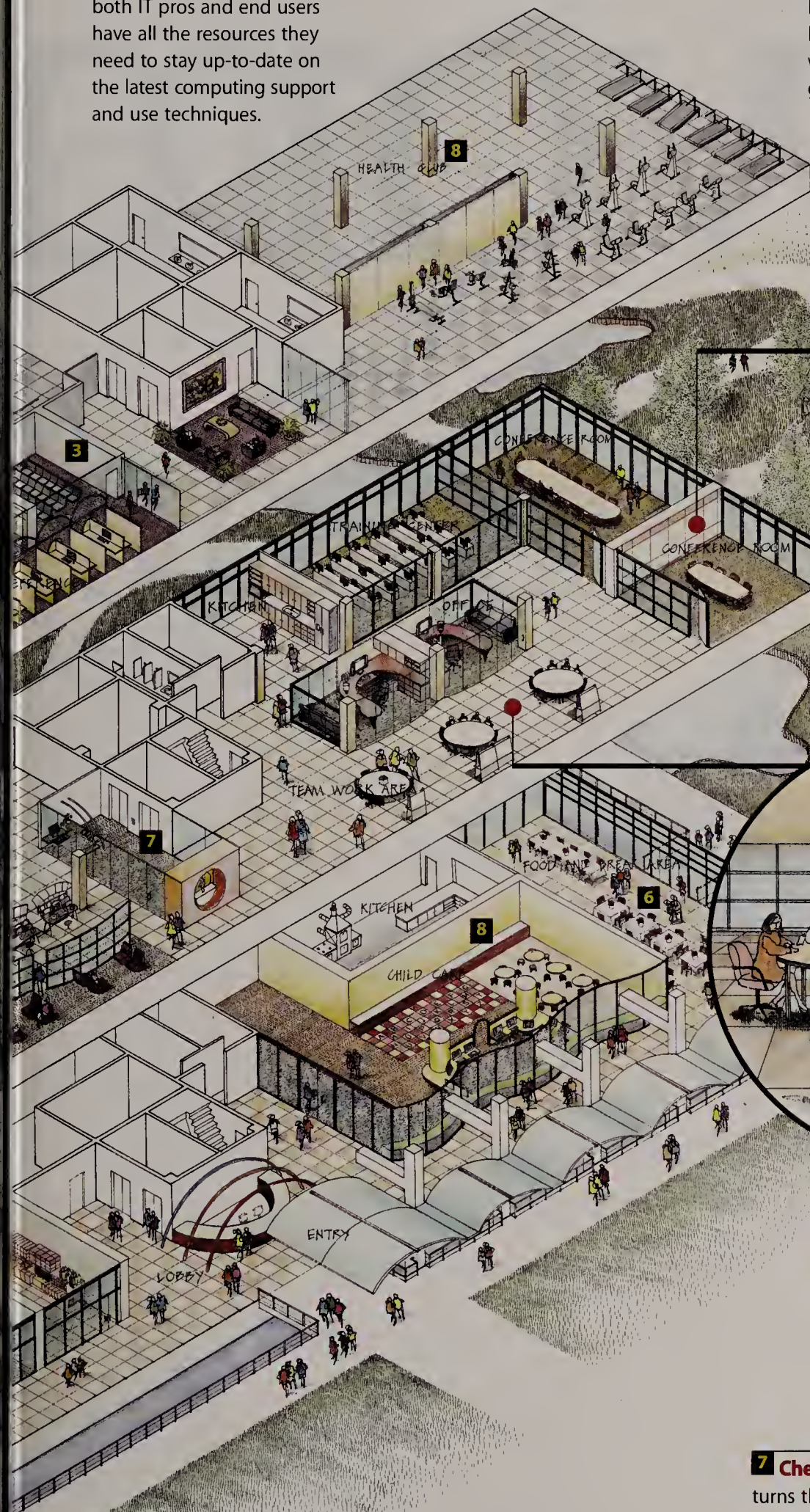
1 Silence, please. IT has its own quiet zone, a haven individuals can retreat to when they need to concentrate. No phones or conversations are allowed. Just reading, thinking and computing. Network PCs are housed in study carrels like those used in college libraries.



9 Room to breathe. In our model, spaces are open but readily dividable into smaller units. People working on common tasks can talk to their teammates in a fairly freewheeling fashion without disturbing others. Cubicles are an obvious solution, but they're not always the best one. Sometimes the best divider is open air unbroken by physical barriers.

3 Train station. Don't forget to add a classroom where both IT pros and end users have all the resources they need to stay up-to-date on the latest computing support and use techniques.

4 Collaborative quarters. Teaming areas accommodate staff meetings while welcoming more off-the-cuff group activities such as brainstorming sessions and even lunch. Formal conference rooms are housed in glass so that nonattendees can see if the room is in use without interrupting an ongoing meeting. All rooms used for group gatherings are set up to accommodate videoconferencing.



5 Walkways work.

Grounds invite stressed-out IT workers to take refreshers and renew creativity. Inviting landscaping, fountains and serpentine walkways go a long way in providing perspective on those days when the demands of the job seem overwhelming.

6 Corral the herding instinct. Rooms for breaks and eating are located in central areas so that people who don't work together directly come to recognize one another as teammates. It's also a clever way to keep people on the grounds during break time in hopes that they'll return to work sooner.

7 Checking in, briefly. The IT-friendly building turns the word *hotel* into a verb, so staff members or consultants—those who come into the facility irregularly—can reserve a comfortable place to work before arriving. These spaces contain all the accouterments of a dedicated office—PC workstation, printer, phone, desk supplies and so on—without the nameplate.

8 Hold that worker. The need for employee retention accounts for the boom in perks like onsite fitness centers, day care facilities, convenience stores, video rental centers, dry cleaners, beauticians, cobblers and even concierges. To some, these may seem frivolous, but such benefits give corporations a human face and certainly help with recruiting and retention.

Continued on Page 52

a woman
seated
in a low-cut dress
of velvet
dark eyes
long straight
brunette hair
she is smiling
almost imperceptibly •

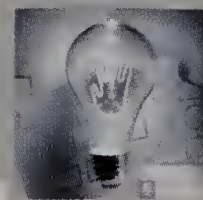
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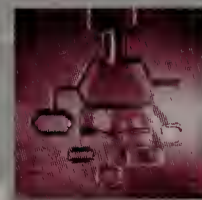
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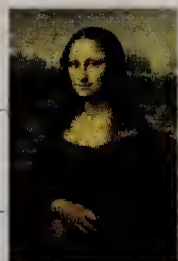
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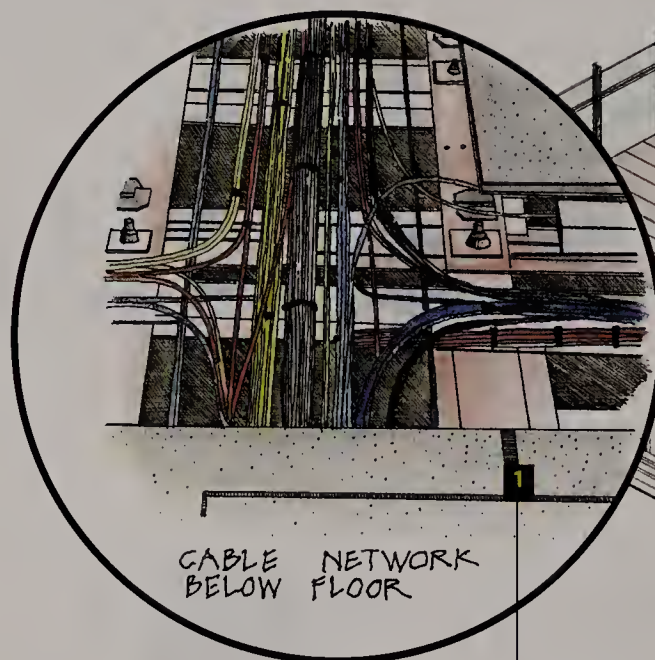
Don't Box In Your Options

2 Plugged in. The IT-friendly building is power-happy, allowing for outlets that provide at least 13 to 15 watts per square foot anywhere that kind of juice might be needed (4 of those watts are designated for the computers). This takes into account that individual workstations may house multiple electronic devices.

IN THE BUILDING OF I.T.'S DREAMS, horizontal spaces are open and room dividers are easily reconfigured; in fact, the only permanent vertical space dividers on any given floor are exterior walls, support columns, elevators and stairwells. All interior walls are moveable to allow for functions performed within the space to change. Absent physical barriers to change, what's to stop an enterprise from remaking itself radically and often if that's what it needs to do to keep up with a changing marketplace?

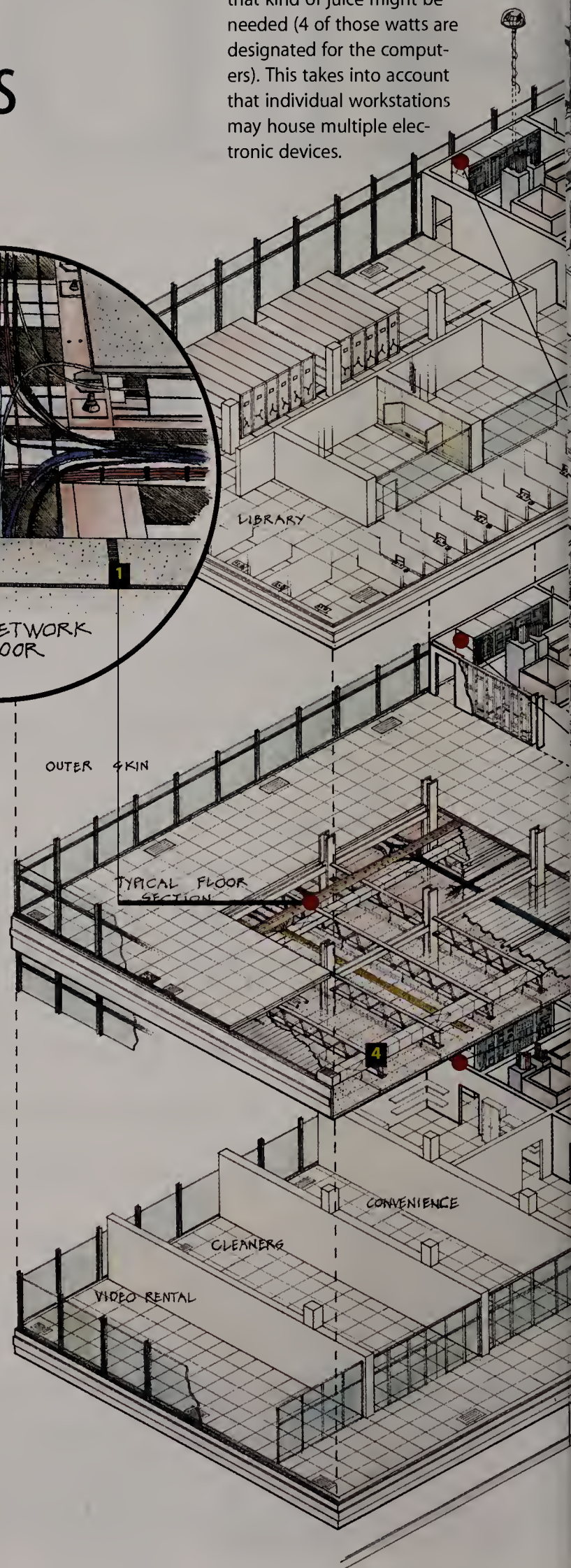
Because much of what we heard from our CIO building consultants revolves around the desire for better housing for wires and cabling, we hasten to point out that wireless technologies will probably render such concerns nearly obsolete in a few years. In anticipation of those days, we're hoping CIOs can use this as a blueprint to the future.

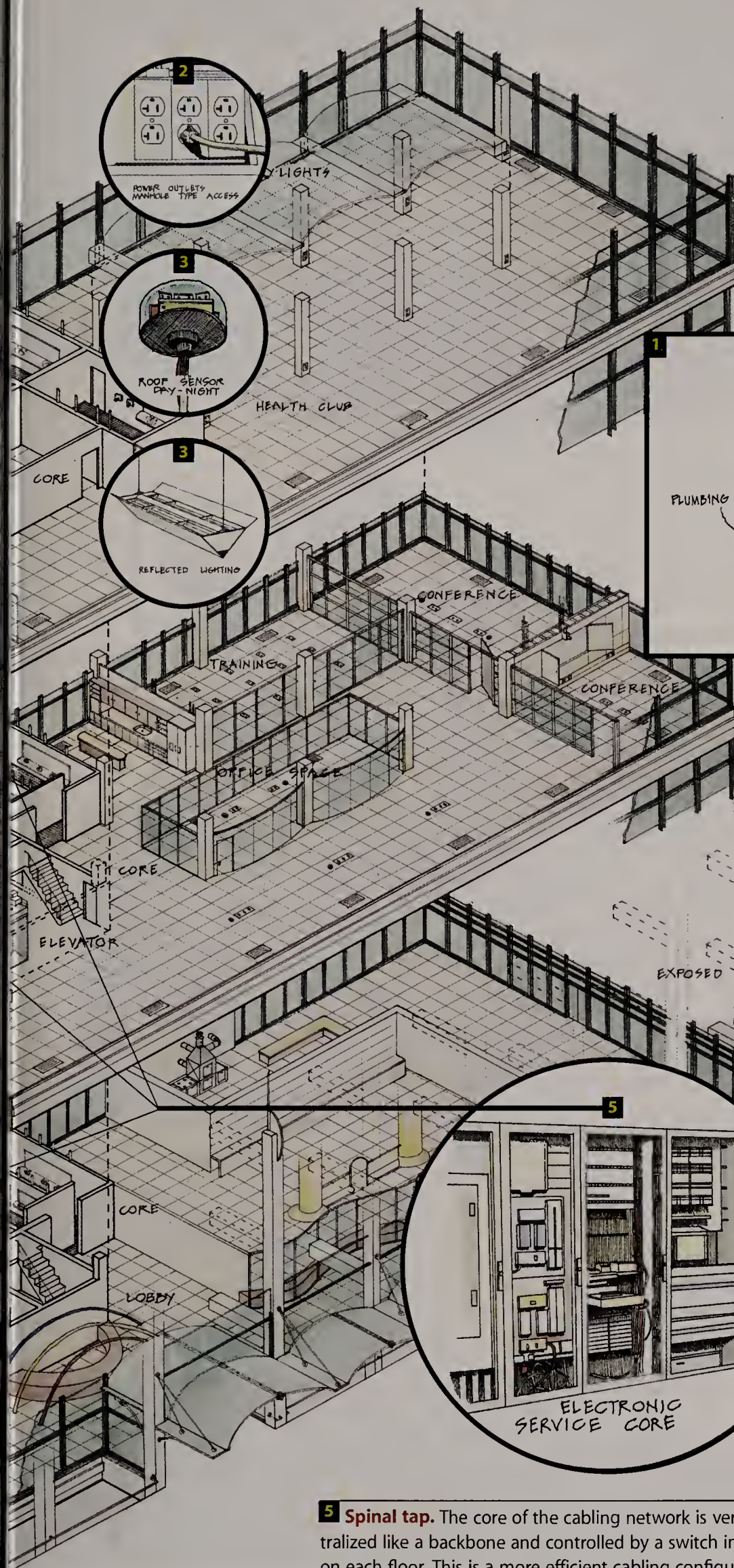
All our sources agree that the key element in an IT-friendly workspace is flexibility. Technologies, companies and product sets all change, to say nothing of customers and the demands their shifting needs often force on responsive companies. Cultural flexibility is closely related to structural flexibility. If your CEO demands flexibility in terms of development and deployment, tell him or her you need flexibility in terms of infrastructure.



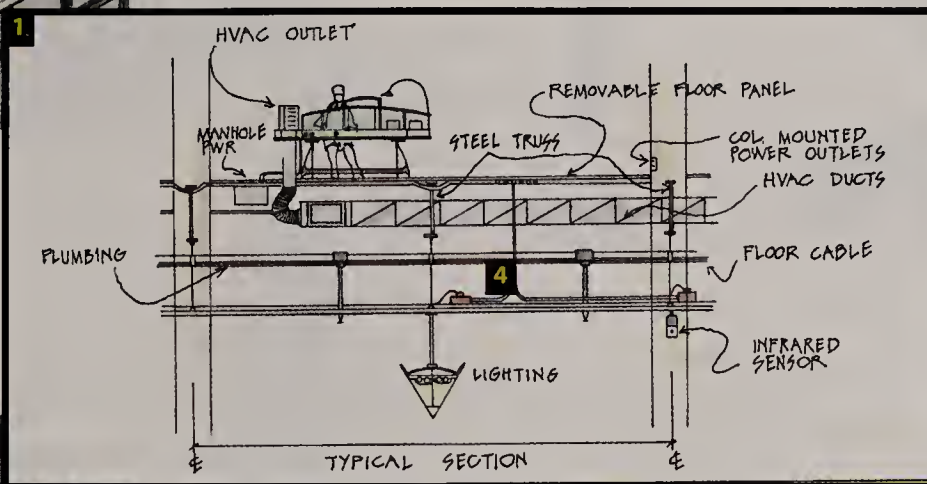
1 The golden age of less mess. Raised flooring throughout the IT-friendly building offers easy access. This allows for quick technology upgrades and changes in the interior configuration should the building's occupant grow, shrink or redeploy departments.

An alternative is to set up permanent, nonraised floors like those in many convention centers with manhole-type access to power, telecom, computer cables and perhaps even water at the corners of 10- to 12-foot grids. Cables run in easy-to-reach, roomy trenches so that they can be replaced without tearing up the floor. The trenches include a divider to separate power and Ethernet lines so that magnetic fields emitted by electricity don't interfere with data signals.





3 Let there be light. Lighting is customized according to the requirements of each workspace. Wherever possible, natural light is favored over artificial, which can be diffused easily in areas under direct sunlight. The general, overhead source mimics natural lighting by providing indirect light—bulbs are positioned to bounce light off the ceiling, cutting glare on monitors. General lighting is computer-controlled and monitored by sensors in each area to compensate for the sun's changing position throughout the day.



4 Keeping cool. The climate-control system concentrates cooling in literal IT hot spots such as server rooms. But since the locales of the mainframes or servers may change, ventilation must be flexible, like all else in the IT-friendly building.

One solution for this flexibility, already common in many facilities, is raised, hollow and perforated flooring in the main computer-housing areas. Rising one to three feet above the structural floor on which it sits (as opposed to the three to six inches in the rest of the building), the raised floor is cooled from within like a wind tunnel.

On Our Web Site

cio.com

For More on Building for IT

Nasdaq's Ideal IT Building: an exclusively online article about Nasdaq's state-of-the-art construction at www.cio.com/archive/050199_bild.html.

For More on Office Design

Alternative Workspaces: Is the office of the future coming to a cube near you? Visit www.cio.com/archive/enterprise/041599_wksp.html.

5 Spinal tap. The core of the cabling network is vertically centralized like a backbone and controlled by a switch in each zone on each floor. This is a more efficient cabling configuration than that of the typical "hubs connected to hubs," in which there is no backbone, just a spider web of interconnected machines. LAN servers and cable closets can be distributed off the spine, up to several hundred feet if need be, to effectively decentralize the centralized infrastructure.

Continued on Page 54

Chair Today, Gone Tomorrow

*You've just built the perfect office building.
Now you get to outfit it with the perfect offices.*

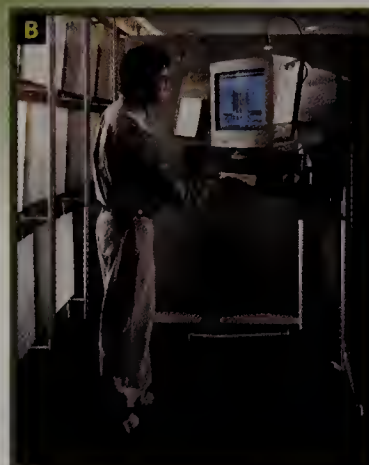
IN YEARS SOON TO COME, THE BEST WORKPLACES WILL EXTEND the flexibility theme from the overall structure of the building to the spaces where people work. You'll be glad to know that furniture designers and manufacturers are already planning for that day. In fact, some are already marketing highly flexible workspace furniture.

HERMAN MILLER INC. of Zeeland, Mich., has developed a furniture suite for what it calls knowledge athletes, information workers who spend many hours in front of a keyboard and monitor. Its Levity Collection is pictured here.

A The mobile equipment cart features a display panel that can be used either as a whiteboard or flip chart. A variety of configurable accessory trays and bins holds CDs, diskettes, personal items or files.



B The freestanding, height-adjustable desk provides extreme and spontaneous adjustability of monitor, keyboard and mouse. The setup accommodates working postures from standing to sitting on the floor and has a counterbalance mechanism that allows modification at the touch of a finger and lifts the weight of even a large monitor. Dimmable document lights are an option. The whole unit is mounted on casters, and its side work surfaces fold down so that it can fit through doorways.



HAWORTH INC. is looking a little further into the future. These conceptual designs were created by the company's design group in Holland, Mich., and are being incorporated into products currently in development.

C **The Wake** is a spatial organizer that "verticalizes" work, allowing the worker to save, organize and produce in three dimensions. It supports paper, a computer, a phone and other necessities in the places the individual prefers. The product's concept is based on research in cognitive ergonomics, the aim of which is to create work environments that help people think and be creative.

D **The Irrigator** is a flexible power-delivery and cable-management system. Cables are routed in an overhead trough and "sprinkle down" where needed. The entire rig moves and pivots over the workspace—like an irrigation system in a field of crops.



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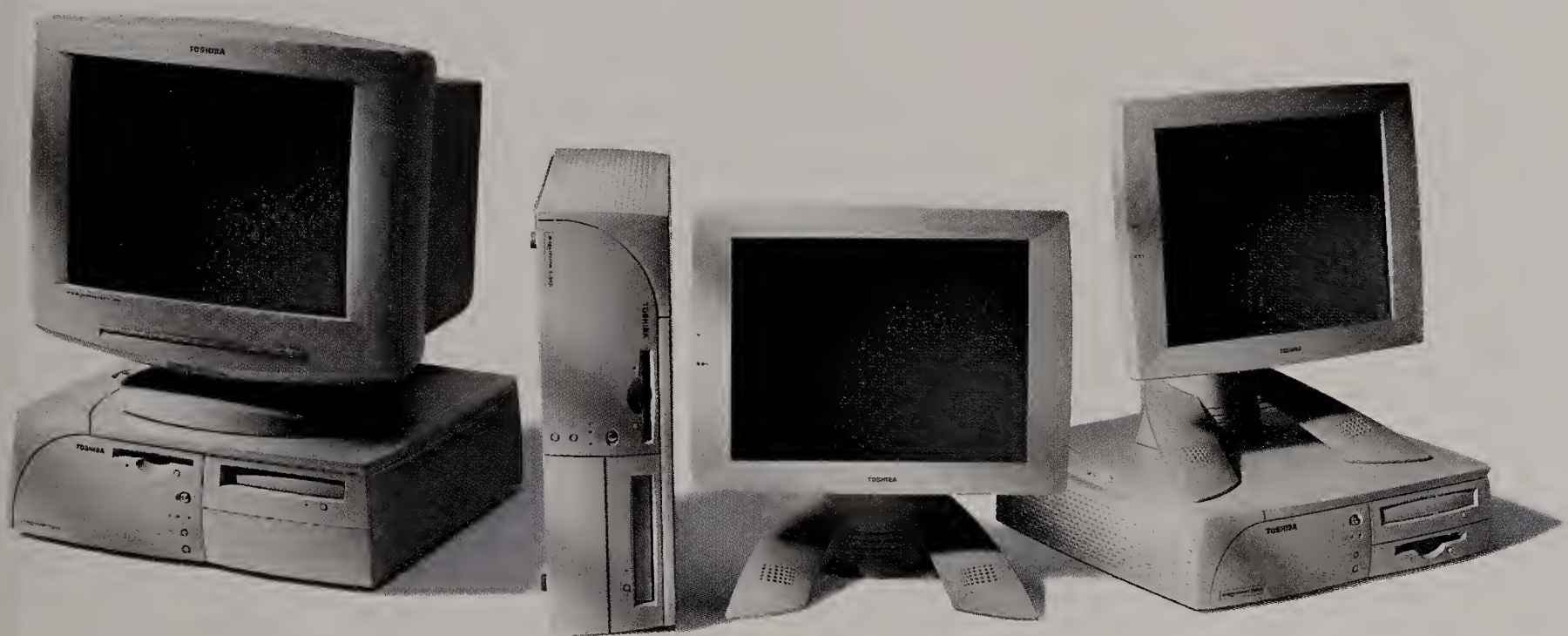
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- Value Keyboard
- Windows 95 operating system
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Great Expe

BY TOM FIELD

Levi Strauss CIO Linda Glick
hopes IT can help resuscitate
the ailing business.

With one year's experience
under their belts, these three
senior executives thought they
were prepared for any crisis.
They were wrong.

Expectations

Reader ROI

Since September 1997, *CIO* has tracked the careers of three newly appointed CIOs. This segment revisits them to see

- ▶ Their latest accomplishments and setbacks
- ▶ How they've met their companies' and their own expectations
- ▶ Their next challenges

For the first two installments of this series, see "Great Expectations," *CIO*, Sept. 15, 1997, and *CIO* Section 1, June 1, 1998. If you're new to the CIO position, look for our upcoming CIO starter kit in the May 15, 1999, issue.

IN RETROSPECT, perhaps we should have called this series "Hard Times." Because even though the CIOs we've tracked for the past two years have risen up to meet great expectations—their own, their bosses' and their peers'—none has had an easy time of it.

At Levi Strauss & Co. the IT organization is more effective than ever. Yet the business is struggling, and CIO Linda Glick is under tremendous pressure to show maximum return on Levi Strauss's IT investment.

David Cooper faces entirely different pressures at Lawrence Livermore National Laboratory. As the lab's first CIO, he has streamlined systems and information flow and helped trim more than \$12 million annually from the lab's IT budget. But off the job, Cooper aggravated an old back injury and may have to choose between major surgery or early retirement.

And then there is Jonathan Fornaci. When we first met this young up-and-comer in 1997, he was CIO of Genstar Container Corp. But last year Genstar merged with an

industry rival, and Fornaci left to become CEO of Ibis Consulting Inc., a sassy Internet systems integration startup that seemed perfectly suited to the restless executive's enthusiasm and expectations. Yet Ibis, in turn, was acquired by another firm, and Fornaci is starting over for the third time in as many years—this time as COO of a startup software vendor.

From the outset of this series, we knew the plots would take unexpected twists. And we have come to realize that great expectations never end; like business itself, they constantly evolve. These executives can occasionally stop and enjoy a momentary triumph—a Y2K fix today, a staff reorganization tomorrow—but there is always a new challenge to overcome. In the following updates, learn how Glick, Cooper and Fornaci have responded to the past year's challenges and how they've adjusted their expectations for the future.

Changing Times

LINDA GLICK HAD A GREAT YEAR. Unfortunately, Levi Strauss & Co. did not.

Glick was on a roll in 1998. She led her IT group to lick 95 percent of Levi Strauss's global Y2K problems, to begin rolling out a common IT applications suite in Europe and to create a Web-based application to support the company's newest custom jeans service.

But business was horrible. Already reeling from a disappointing 1997, in which sales declined for the first time in a decade (by 4 percent, from \$7.14 billion to \$6.9 billion), Levi Strauss was further pummeled in 1998 by a jarring 13 percent slump that saw sales dip to \$6 billion. Global economic crises in Asia and Brazil are partly to blame for the company's losses, but executives are also frustrated by a weakened worldwide demand for Levi's jeans. Teens have always been a target market for Levi Strauss, but suddenly young people are flocking instead to rival brands such as Guess and Tommy Hilfiger.

In the face of these struggles, Levi Strauss is trying to get leaner and meaner in the marketplace. The company recently announced that it will close half of its 22 manufacturing plants in North America, resulting in a 30 percent reduction of its U.S. and Canadian workforce. Senior executives are brainstorming how to regain lost market share. And Glick, who has tried for two years to get her IT group up to speed with the old business strategies, now finds herself helping to plot the new.

Delivering to the Customer

Historically, the Levi Strauss IT organization has been internally focused, building new applications and networks to improve workflow among employees. The imperative now is for the company to get closer to its customers and deliver systems that give them greater access to Levi Strauss products. It's a new role for Glick, but she likes it. "There's a buzz in the building now," Glick says. "This notion of getting to know our customers is very exciting."

IT has begun to meet its mission with a revamped Web site (www.levi.com),

which allows consumers to browse and buy premanufactured jeans online, and with Original Spin, a new iteration of Levi Strauss's Personal Pair service. Personal Pair, introduced in 1996, allowed customers to have their measurements taken at Original Levi outlets where their orders for custom fit jeans were sent via the Web to manufacturing facilities. But where Personal Pair was for women only and available exclusively at Original Levi outlets, Original Spin targets men, too, and is also available at major department store chains. Glick is encouraged by these

side with business partners in design, marketing and other business departments, and IT leaders report to both IT and their respective business departments. Glick wants her employees to be internal IT consultants, helping business executives articulate and fulfill their technology needs. Therein lies the next challenge: putting the right people in place. Companywide, Levi Strauss is reducing its operating budget by about 20 percent this year. But Glick must still promote and hire people to fill key roles.

Glick is also embarking on an IT standards campaign to create a companywide technology platform. So far, she has succeeded in moving Levi Strauss from five different e-mail applications to one. She hopes to have equal success with desktop systems and networks.

When Glick was first appointed CIO, she inherited an IT group viewed by many senior executives as pure expense. Glick made it her mission to develop a set of metrics by which she could prove IT's return on investment. So far that goal has eluded her. "It's hard to explain," Glick says. "A million dollars in IT—what's it relative to?"

Still, Glick has made positive impressions upon her business peers. "The IT organization is leaner, more focused and is gaining increased understanding and credibility at the board

level," says Levi Strauss President and COO Peter Jacobi, who has been Glick's immediate supervisor and longtime confidant. But Jacobi recently announced his forthcoming retirement, leaving Glick to deal not just with changing times but with changing leadership. Not that she's too concerned. "I've had lots of bosses in my career; this is a chance to meet another one," she says pragmatically.

Tailoring a Legacy

No one anticipated the tough times that have befallen Levi Strauss, but the real surprise for Glick is how her CIO responsibilities consume her thoughts. "That's the big 'aha' for me," she says. "The job isn't about how many hours you spend in

LINDA GLICK

**Senior Vice President & CIO
Levi Strauss & Co.
San Francisco**

Background: A 23-year veteran of Levi Strauss, Glick was appointed CIO in late 1996. In her first year as head of the information technology organization, Glick tackled the Y2K bug and began building partnerships with her business-side peers.

Second-Year Goals

- Begin European ERP rollout
- Develop new electronic commerce initiatives
- Leverage the IT group's worldwide resources

Second-Year Results

- Helped develop new customized jeans service
- Began major worldwide IT reorganization

Future Challenge

- Help Levi Strauss rebuild its ailing business

early customer-facing initiatives, in which IT had a hand. But to effect change, she must give up some old projects and embrace some new, and organizational restructuring is now her top priority.

Refashioning the IT Organization

Up until now, IT has been decentralized globally into three autonomous divisions: North America, Europe and Asia. Within each division, IT has operated in service of, but not in partnership with, the business offices. In Glick's new global restructuring, all three major IT organizations are under her direct control, and she is fully accountable for all technology decisions. IT staffers worldwide are being redeployed to work side by

Maintaining Momentum

THE GOOD NEWS IS THAT DAVID COOPER LOVES HIS JOB. As an outsider to the insular, universitylike laboratory, Cooper has brought new business practices such as IT standardization to the 47-year-old nuclear weapons development facility and built solid relationships with longtime lab employees who historically have been suspicious of outsiders.

The bad news is that a back injury could prompt Cooper to leave this job he loves. After a household accident in 1980, Cooper had three vertebrae surgically fused. He resumed a normal, active life—until last year, when he re-injured his back. Now he can hardly stand or sit for even short periods, never mind endure the long hours of air travel his job requires. Recent tests indicate that Cooper has ruptured three additional disks above the initial fusion. His options are to live with the pain or undergo additional spinal fusion. He's likely to opt for the knife, which would put him out of commission for weeks at best. And even then, there is no guarantee that he'll regain full mobility and return to work pain-free.

That's a shame because Cooper

has made a difference at LLNL. When he first joined the lab in 1995, there was no central IT group, no IT standards. Six of the lab's 10 individual directorates had their own desktop support groups and the supported systems were endless. LLNL was spending roughly one-quarter of its \$1 billion annual budget on IT, but there was no coordinated effort to maximize that investment.

Today Cooper oversees a new labwide desktop/network support group of 200 individuals who service all systems for all directorates. Purchases and licenses have been consolidated to the tune of \$12 million to \$14 million in annual savings, and Cooper's cross-functional Information Architecture Group has just drafted a new strategic plan that outlines

network, desktop, security and management standards.

Cooper credits his quick progress to people's eagerness to run LLNL less like a college and more like a business, and he has learned from business executives along the way. He attends IT conferences and networks with a handful of Bay Area CIOs. "To be successful as CIO, I had to understand the customer and service provider perspectives. I had to learn how to interact with my customers—the other associate directors," he says. Once he established those relationships and identified and began filling his customers' needs, things moved faster.

Lab director C. Bruce Tarter says Cooper's greatest success has been his ability to balance business goals

alongside the lab's government and academic influences, the confluence of which makes network security, Y2K and day-to-day operations at LLNL more complicated than in a corporate environment.

If Cooper can stay on, the opportunities for success will only increase. Right now, his group is wrapping up its Y2K remediation. On tap for next year are three key projects:

■ **Total cost of ownership.** Cooper must determine exactly what LLNL spends for desktop computing, networks and support and then conclude if anything should be outsourced.

■ **Strategic plan.** Cooper must oversee implementation of the new desktop, network and security standards.

■ **Database standards.** LLNL has so many legacy databases, many of them holding key national security information, that there is no one standard system that can embrace them all. Cooper must determine which of these databases can be dismantled, converted to a standard system or preserved.

But can Cooper stay on? At 59, he'd hate to retire. But if surgery doesn't relieve Cooper's pain, then he's going to have to reconsider. "I'm not going to retire anytime soon unless I can't work. I love the job too much," he says. "But if I'm like this in two years [when he's fully vested], I will have to leave."



DAVID M. COOPER

Associate Director of Computation & CIO
Lawrence Livermore National Laboratory
Livermore, Calif.

Background: Hired away from NASA in 1995; in October 1996 Cooper was named the lab's first CIO. In his first year, Cooper moved to consolidate the lab's disparate systems and expenses and initiated the first set of software standards. He won popular support with successful efforts to increase IT staff's pay and loosen stringent Internet use restrictions.

Second-Year Goals

- Finalize and implement strategic information architecture plan
- Identify and implement new labwide hardware standards
- Consolidate lab's desktop/LAN support services

Second-Year Results

- Strategic information architecture plan was completed and adopted
- Hardware standards have been set
- New desktop/LAN support group is up and running

Future Challenge

- Find new ways to bring business best practices to the lab

A New Beginning

TWO YEARS AGO, JONATHAN FORNACI PRIDED HIMSELF ON NEVER staying at a job for more than two years. There was always greater money and a greater challenge elsewhere. Since then, the fast-moving 35-year-old hasn't stayed put for even one year.

The latest change came in November 1998, when Ibis Consulting Inc.—the firm Fornaci joined as CEO the previous March—was acquired by Proxicom Inc., a Reston, Va.-based consultancy. Eliminating his own job in the transaction (Proxicom already had a CEO), he soon found himself looking for work again.

In January, Fornaci signed on as COO at Luna Information Systems, a startup vendor of electronic commerce-enabling products in Oakland, Calif. Fornaci knows he's jumping into a sea of competitors selling fleets of e-commerce applications, but he thinks Luna's is the best at helping companies move their traditional sales processes to the Web. And he knows that a startup company needs more than a good product; it needs a champion to take charge internally and spread the word externally. That's the challenge Fornaci welcomes.

"If this company is going to fail," he says, "then it's going to be because I didn't get the product or marketing message out there or because I didn't build the right team."

Fornaci has no doubt that his CIO experience will pay off in this new job. "I understand the issues CIOs have out there, and I also care about business value and ROI," he says. He can speak the IT language. And he has been on the other side of the table from software vendors. He's heard their sales pitches and airy promises, and he's seen a lot of products that didn't

fulfill their hype. In his new role, Fornaci not only must deliver a product that works as advertised, but he also must put it in a context that is meaningful to CIOs.

Fornaci will be drawing upon his CEO experience, too, as he tries to get Luna off the ground. Immediately, he must move the company to larger, permanent headquarters in Oakland and prepare for the company's product launch, scheduled for the second quarter of this year.

At a stage in his life when he's looking for a little more balance between the personal and the professional, Fornaci also realizes that Luna's launch requires long hours and high energy. The risk is that no matter how much effort Fornaci puts into the venture, the company could fail. Then he's back on the street looking for work. But if Luna gets off to a good start, Fornaci expects a promotion to company president. In that role, he could see himself sticking around far beyond his usual two-year timetable, and the long-term rewards could ensure financial security.

Anything is possible. "We could go IPO in a year; we could be acquired in two years," Fornaci says. "In the software business, you just never know."

JONATHAN FORNACI

COO
Luna Information Systems
Oakland, Calif.

Background: Fornaci joined Genstar Container Corp., a GE Capital company, as CIO in early 1997. After Genstar merged with an industry rival, Sea Containers Ltd., in early 1998, Fornaci left to become CEO of San Francisco-based Ibis Consulting Inc.

Second-Year Goals

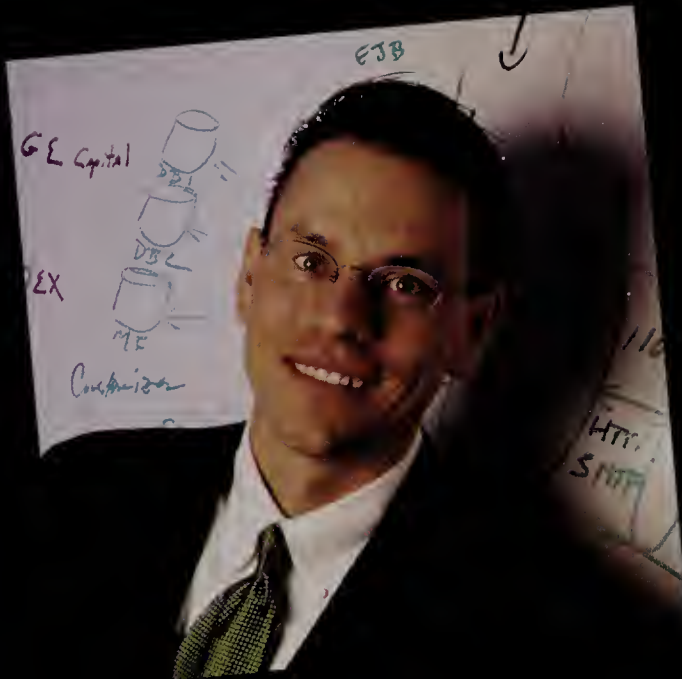
- Establish Ibis in consulting marketplace
- Manage startup company's rapid growth
- Position Ibis to go public or be acquired

Second-Year Results

- Led Ibis from \$900,000 to \$2.2 million monthly revenues
- Grew company from 70 to 200 employees
- Oversaw \$90 million stock acquisition of Ibis by Proxicom Inc.

Future Challenge

- Leverage his CIO and CEO experience in his new job as COO of a startup software vendor



the office or how much time you spend answering e-mail from home. No matter where I am, there's always some kind of constant thought about work."

While Glick, now 51, is hardly ready for retirement, she can't help but think about her legacy. She wants to be known first for attracting and retaining talented business technologists for Levi Strauss. Second, she wants to be remembered as a leader who helped business executives get the most out of IT. "I would like to think I will have influenced [Levi Strauss executives] to appreciate how technology can help them work," she says. "I hope my influence is to say, 'Use technology; spend your investment wisely; understand your role in managing IT.'"

Glick stops suddenly. "God, I'll have to work 'til I'm 75!" she laughs. "No," she adds quickly. "I'm more optimistic than that."

Last Words: Great expectations continue for Linda Glick, David Cooper and Jonathan Fornaci, but our series ends here. We thank them and their companies for the insights and access they've given us the past two years. **CIO**

Senior Editor Tom Field can be reached at tfield@cio.com.

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New Productivity Goals for 1999

The Productivity Goals for 1999 have been published. These are the productivity goals for the year 1999. The goals are: to increase productivity by 10% in the year 1999. The goals are: to increase productivity by 10% in the year 1999. The goals are: to increase productivity by 10% in the year 1999.

Employee of the Month

The month's Employee of the Month is Jane Farnsworth of the Human Resources Department. Jane has been with HP for 15 years. Jane is a very hard worker. Jane is a very hard worker. Jane is a very hard worker.

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An expert on complexity ponders the end of the millennium

Y2K chaos

BY DAVID PEARSON

There's a scene in *Jurassic Park* where the chaos theorist played by Jeff Goldblum says, with equal parts foreboding and hope, "Life will find a way. Life always finds a way." Talk about Y2K with Margaret J. ("Meg") Wheatley, the chaos theorist best known for her 1992 book *Leadership and the New Science: Learning About Organization from an Orderly Universe* (Berrett-Koehler), and there comes a point when she says, in so many words, the same thing. Coincidence—or life imitating art? Your call.

Reader ROI

Y2K MAY SPELL CHAOS for some, but it doesn't have to mean out of order for anyone. Read on to learn

- What natural disasters can teach you about Y2K
- Why the Y2K challenge is as much human as it is technical
- How to think of Y2K as an opportunity rather than as a problem

Just keep in mind that the movie character had resurrected dinosaurs on the brain, while Wheatley is preoccupied with something far larger and a lot less predictable.

And Wheatley, a partner in two Provo, Utah-based organizations concerned with exploring new ways of organizing human endeavor—Kellner-Rogers & Wheatley Inc. and the nonprofit Berkana Institute—approaches the Y2K beast with a simi-

Chaos theorist Meg Wheatley believes that companies can use complexity science to prepare for Y2K.



lar admixture of fear and excitement: She characterizes Y2K as a technologically induced problem that represents "an unparalleled opportunity for either social transformation or social disintegration."

In seeking to nudge events in the direction of the former, Wheatley talks a lot about the nature of life

planning lets you map out a rich, logical cause-and-effect tree. And just going through the scenario planning process forces you to become aware of how events might logically trigger other events you wouldn't otherwise foresee.

to **look far beyond** the narrow boundaries of roles and job descriptions

To get through Y2K, people will need



and the universal behavior of similar systems that lies at the root of chaos theory. In fact, those reference points seem to inform all her views. "As we understand the processes by which life organizes itself," she says in a barely audible hush, "and as we learn how to work with life's creativity rather than controlling against it, we are discovering a path filled with new

possibilities for how to work and create together."

If at times she comes across to the business audience as disconcertingly cerebral (a clue to her muse: An ongoing Berkana conversation series features the author of *The Tao of Physics*), Wheatley finds a way to tie every meditative observation into some practical application. A Harvard EdD in administration, planning and social policy, she spent two years in Korea with the Peace Corps and five in education before moving into writing and consulting. Along with longtime collaborator Myron Kellner-Rogers, she works with groups as diverse as the U.S. Army, public schools, communities and international corporations. The pair published *A Simpler Way* (Berrett-Koehler) in 1996, a gentle philosophy positing that life is always moving toward organization. In their consulting work, they combine the ideas and language of complexity, physics, biology and chemistry to help organizations understand themselves as living systems.

Wheatley spoke with CIO Senior Writer David Pearson on how complexity science, the body of mathematical and logic processes that includes chaos theory, might be applied to contingency planning for Y2K.

CIO: On what aspects of complexity science can CIOs draw in planning contingencies for Y2K?

Wheatley: I think very rigorous scenario planning can be extremely informative. By taking into account all kinds of factors and players and actions, you can incorporate some real complexity and richness in your planning. I was talking to an executive from a power company on this, and he said, "Personally, I'm looking at not being able to travel for several months, and I'm storing several months' worth of food." Now can you imagine what the social conditions would be if people couldn't get food for three months? Do you think it would matter that you had these stores if the situation was that dire? Scenario

But when you consider that many may never come to pass, the exercise could amount to an enormous waste of time.

Well, it's a matter of seeing this as a top priority and having perspective on it beyond your basic business concerns. What we're really talking about is preserving not only individual enterprises but also communities and social infrastructures. If there are some CIOs out there for whom [Y2K] still isn't at the very top of the priority chain, watch how it pushes everything else aside when news of the first failures starts trickling in. Practically speaking, CIOs and their companies should at least map out how they'll make do if they can't get foreign supplies for a while. You definitely want to be thinking in terms of your supply chain.

Have you heard of anyone so overwhelmed by the complexity that they're simply saying, "There are so many variables I can't do anything about. When it breaks, we'll fix it."

Yes, actually. There have been some corporations that have stopped their efforts because they've realized that no matter how much money they put into this problem, they can solve only one small fraction of it. In fact, that's one of the learnings: Because of the vast interconnectedness, there is no one place of safety. You can't just take care of your own fires and think you're out of danger.

What would you have done up to this point about Y2K if you were a CIO?

By this time I would be very much engaged with my colleagues on the nontechnical side of the organization to figure out how we're going to bring the organization together and apply everybody's mind and everybody's capacity to preparing for the various potential scenarios. What are we going to do if three suppliers fail? What are we going to do about our banking? What are we going to do about the fact that we're in a major metropolitan area and people may not be able to get to work? One of the frustrations has been that, even among the companies that started early, there isn't the feeling that someone has a handle on it. They may feel that they're in good shape internally, but having been in the Y2K trenches a couple of years they recognize

how deep into their organization the tentacles may reach from outside.

One of the interesting things we saw in the aftermath of Hurricane Andrew was that people were willing to go back to work, but they couldn't get any day care. And that was a major snag to bringing the area

they're comfortable with.

back—until they started bringing in retired people to provide day care. So I think I'd be doing that sort of contingency planning now at the level of the individual lives of the employees and how we're going to sustain them, up through the communities where we reside. And then I'd want to be preparing internally, really working hard to develop relationships within the organization and between the organization and all the other entities with which it regularly interacts.

You seem to see Y2K as much less a technical challenge than a human one.

Yes, and this is particularly interesting if you think about it from the CIO's perspective. At one level, CIOs appreciate the interconnectedness of a vast

system better than most. But if those systems go down, I don't think it's necessarily in the CIO's consciousness to consider how to take a system that was built on technology and now develop it in terms of human relationships. How do we trust each other and rely on each other? Can we move past the idiosyncrasies or the competitiveness that underlie so many of our relationships? To get through Y2K, people will need to look far beyond the narrow boundaries of roles and job descriptions they're comfortable with. We're all going to have to work with different people than we've worked with before, and we'll have to work with everyone in very different ways.

Do you see any use in developing a best practice for Y2K contingency planning?

None at all. You know, some organizations are doing extraordinarily interesting things. But someone from another community would look at it and, since they're not operating from a centralized, controlled commission, they would simply say, "Well, that's interesting and some of it would work here, but the rest of it would not." Which of course is what happens when you're transferring best practices in any endeavor.

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So CIOs shouldn't be telling people what to do about Y2K; they should be telling them how to learn about it?

That's right. The real need here is to get everybody focused on how we could operate if things start moving more slowly—how we can adapt if a system should fail for any reason. What's really neat in a corporate

just waiting to be asked to exercise their intelligence on behalf of the corporate mission. This is a great opportunity for them. But I fear that it will not be approached that way in most organizations. Some will just see it as an absolute need for heroics and Patton-style leadership.

will **arise** that otherwise wouldn't have had a chance?

The potential for mass extinction is there, but what new and superior systems



environment is figuring out how you're going to engage everybody in preparing for different scenarios. Particularly, how will you engage people who would suffer from slow-downs and stoppages? You want people to know how to handle those things. If they're not invited in now, and they're just surprised by it, then you haven't created any capacity

and people are going to get panicky. Also, who will feel offended that they weren't told earlier and allowed to contribute? It needs to be like a wartime effort: We're all in this together. You'll get extraordinary levels of support with that approach if you're sincere. But if you exclude people now and then ask them to come in and rescue you later, they're going to need some coaxing.

You write a lot about nature—the ways disorder always gives way to higher order. Is there a corollary between nature and Y2K?

People have been making the analogy that this is going to be like an earthquake of about magnitude nine on the Richter scale. You know it's going to hit but you don't know exactly when, and you don't know where the shock waves are going to go. One of the other lessons from nature is that nature uses these great periods of upheaval to create evolutionary leaps—but often at great cost. The potential for mass extinction is there, but what new and superior systems will arise that otherwise wouldn't have had a chance?

It sounds like you're excited about the possible Y2K meltdown because organizations will be able to learn about themselves.

No, I'm not looking forward to it, because I think some of it is going to be pretty bad for some people. And I'm also not sure that we're necessarily going to learn from it, at least in the ways I would like us to learn. You and I and four other people can all look at a problem like this and some of us will respond to it based on our old [ways of] learning. Some could come in very heavy-handed, dictatorial: "Someone's got to take charge." And others might say it's a great opportunity to really access the intelligence in the organization. I find in every organization, people are

How would you analyze current preparations for Y2K through the lens of complexity?

In a complex, adaptive, living system, individuals do what they do in their own locations. And when they are also connected through good communication pathways and they're aware of what's going on elsewhere, they are able to create very sophisticated and complex systems that have much greater capacity than you'd ever have predicted in your little localized activity center.

Right now it seems people are seeing what kinds of synergy and additional capacity is possible once they start learning from each other. But it's not being approached in the "Let's find the one best practice and broadcast it across the country" vein. It's "Let's just find a way to connect people so that they can index the information categories and find what they need to know very quickly." Be that as it may, none of this is our traditional, top-down planning and dictating. It's very bottom-up. And in that way you really replicate the nature of complex adaptive systems. Connecting to each other is a critical need. The communication has to occur; otherwise there is no learning and no stepping up to another level of competence.

What makes the contingency planning process so complex?

Because these contingency planning processes are not centralized, not controlled, they can look incredibly messy and chaotic. Each one is different. That's one of the great lessons of complexity science: You're going to see enormous levels of diversity of thought based on localized conditions. This is something we just have not looked at from a management perspective because we've felt there's one best way, a best practice, and you just need to incorporate it into your organization. And complexity theory says exactly the opposite. You support local initiatives, make sure they're learning about other local initiatives and stay out of it. They should be getting ready to think about how they'll deal with a lot of things happening on a lot of different fronts, all related in one way or another to this precipitating turn of events. **CIO**

Senior Writer David Pearson can be reached via e-mail at dpearson@cio.com.



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Emerging Technology

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Edited by Howard Baldwin

Time for a Y2K Audit

Validation and verification tools catch errors the second time around

BY PEGGY KING

IN CONTRA COSTA COUNTY, JUST NORTHEAST of San Francisco, CIO Steve Steinbrecher and his team began remediating and testing 3 million lines of mainframe code in January 1996. By December 1998 the county's Team 2000 had remediated and tested every IDMS application at its Martinez, Calif., data center and at facilities throughout the county.

One of the most expensive aspects of the effort was live testing of all the county's judicial and public safety applications, including the application for scheduling criminal court hearing dates and times in 48 courtrooms. Steinbrecher estimates the county spent \$66,000 to test a single court application, and that doesn't include the time volunteered by salaried workers who came in on weekends and holidays for the tests. "We felt we needed to test everything," says Steinbrecher. "We looked for an auditing tool but did not find one, and we ended up writing some of our own testing algorithms in-house."

At about the time Team 2000 was finishing the testing, Steinbrecher learned of an independent validation and verification (IV&V) tool for IDMS code called SmartAudit from Alydaar Software Corp. of Charlotte, N.C. This was the kind of tool Team 2000 had hoped to find more than a year earlier. Steinbrecher realized an IV&V tool would be a good way to double-check the thoroughness of his team's efforts.

Although Contra Costa County had a choice about whether to conduct IV&V, also known as code auditing,

as a step in the Y2K preparedness process, publicly traded companies, state government entities and agencies don't have a choice. In July 1998 the U.S. Office of Management and Budget (OMB) mandated that state and federal agencies conduct an independent audit of their year 2000 remediation efforts. In August 1998 the Securities and Exchange Commission (SEC) issued a letter



to publicly traded companies strongly advising them to demonstrate due diligence in their Y2K efforts. CIOs and Y2K project teams are responding to these mandates by engaging the services of Y2K vendors—but not those whose software tools and services they used in their initial remediation efforts. Using a different tool on a second pass through the same code increases the likelihood of detecting potential date errors that slipped through the first time.

You probably aren't thrilled to know that there is yet another step in correcting the Y2K problem. To compound the confusion, consultants and vendors have varying views on whether IV&V is a process or merely a product. Some prefer a narrow definition of Y2K-related IV&Vs. "Y2K remediation vendors have begun to package their Y2K remediation products as IV&V offerings," says Andrew Bochman, director of Y2K services at Aberdeen Group Inc. in Boston. "In essence, performing an IV&V simply means putting a sampling of one's remediated code through a different scanning tool for quality assurance purposes." As he sees it, an organization can perform IV&V with any language-specific tool that checks date fields as long as the tool is different from the one used in the original remediation work.

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Emerging Technology

More Than Due Diligence

Although a diverse group of people, including lawyers, elected officials, auditors and underwriters, are urging companies and agencies to conduct IV&Vs, sound technical reasons exist. "Now that the results of independent code audits are coming back, organizations are finding on average about 100 date-related errors per million lines of 'fixed' code," says William Ulrich, president of Tactical Strategy Group Inc. of Soquel, Calif. "Some organizations that outsourced their remediation efforts are finding that their vendors did not review the results. An IV&V process can impart needed discipline in cases where quality assurance procedures were lacking."

Another good reason for a second, fresh examination of one's code is that newer tools are better at catching errors than are earlier versions of products that many organizations used in their initial remediation efforts. Rick Kich, now CIO for computer distributor Ingram Micro Inc. of Santa Ana, Calif., selected CA-Fix/2000 when he was overseeing Y2K remediation efforts as CIO for the Barnes & Noble Inc. retail bookselling chain. "Technologies are changing so quickly that we get updates to Fix/2000 on a monthly basis. And every new version of the tool catches some date field errors or broken windowing logic that slipped through undetected the first time," says Kich.

Vendor Management Issues

One of the challenges of selecting an IV&V is finding a vendor that can work with the mix of platforms and languages that your IT organization has used in its mission-critical applications. A growing list of vendors, including Computer Associates International Inc. of Islandia, N.Y., AverStar Inc. of Burlington, Mass., Data Integrity Inc. of Coral Springs, Fla., MatriDigm Corp. of San Jose, Calif., Reasoning Inc. of Mountain View, Calif., and Viasoft Inc. of Phoenix, offer extensive consultant-delivered IV&V services for Cobol and other languages. These vendors often subcontract to other vendors that have tools in languages that lie outside their areas of expertise. For example, Reasoning has

Networks Without Obstacles

A new high-speed link offers wide bandwidth over wide terrain

PROBLEM: YOU NEED THE BANDWIDTH of an optical fiber connection, but running a fiber cable is either impractical or too costly. A solution may soon become available in the form of wireless optical technology that can send data across distances of up to three miles at speeds as fast as 10Gbps. The system has the poten-

ing telescope, where it is focused onto the core of an optical fiber. Unlike radio-based technologies, such as microwave links, wireless optical communications doesn't require government licenses or frequency allocations. High-speed optical connections are also much faster than microwave links, which top out at 622Mbps.

High-speed wireless optical connections will complement, not replace, conventional fiber-optic technology, says Jim Auburn, director of photonics applications at Bell Lab's government solutions unit in Whippany, N.J. "Fiber is certainly going to be a more reliable and available connection, but in places where fiber is very expensive or impractical to lay,

over-the-air optical links would be cost-favorable." Auburn says new high-speed wireless optical hardware is compatible with most existing optical and data networking equipment. On the downside, Auburn acknowledges that adverse weather conditions, such as heavy fog and snow, can interfere with reception.

DWDM's potential applications include connecting buildings across a campus, town or small city as well as providing temporary data links at sporting events, battlefields and disaster sites.

Lucent hasn't yet set a timetable for the technology's commercial release. "We are looking at a range of options," says Auburn. "Right now, it's just being considered for commercialization."

—John Edwards

WIRELESS OPTICAL

tial to provide high-speed data streams between points at a short-term event like a trade show or over hostile terrain like water or someone else's property.

This experimental networking system, being developed initially for military purposes by Bell Laboratories Inc.'s government solutions unit, uses a pair of custom telescopes built by AstroTerra Corp., a San Diego-based manufacturer of optical wireless communications equipment. Optical transmitters and receivers as well as a high-power optical amplifier from Bell Lab's parent company Lucent Technologies Inc. round out the system's other key components.

The system uses dense wavelength division multiplexing (DWDM), which is best described as a way to increase capacity by transmitting information over multiple wavelengths of light rather than over a single wavelength. It sends data through the air from a transmitting telescope to a receiv-



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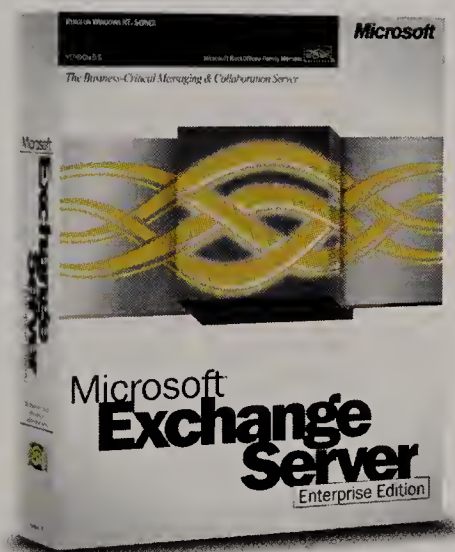
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Emerging Technology

used MigraTec 2000 from Dallas-based MigraTec Inc. to scan C++ code.

In large, complex organizations and governments, software audit processes usually involve multiple vendors because no one vendor has the complete array of language-specific tools needed to serve the needs of organizations with multiple data centers and unique assortments of legacy systems. Managing all the vendors for these complex audits isn't easy. You can let one vendor do all the subcontracting or, at the other extreme, you can hire multiple vendors and contract separately for project management services. The states of Iowa, North Carolina and Washington have each taken a different approach to conducting IV&Vs as part of their statewide Y2K risk assessment processes.

In Iowa, the executive branch of the state government put one vendor, Computer Technology Associates Inc. (CTA) of Bethesda, Md., in charge of a comprehensive software quality audit involving 35 different agencies. The legislative and judicial branches are considering CTA for their IV&V work. CTA audits each agency's code with a five-step process. It selects a suitable tool for IV&V, uses this tool to scan the agency's code, issues a report on problem areas within the code, identifies areas for IT process improvement and issues color-coded progress reports (green for satisfactory progress, blue for finished and red for behind schedule). Onsite consultants work with agency directors to assess what steps will be needed to obtain a sign-off from CTA. Of the 10 CTA staffers who work onsite at Iowa's government offices, only 2 use tools to scan production software.

In its year 2000 risk assessment project that encompasses 160 state agencies in the executive branch, the state of Washington takes a less centralized approach to IV&V than Iowa in overseeing its 103 independent Y2K projects. Each agency in that state is responsible for managing its own Y2K project and for selecting the IV&V tools best suited for scanning its own code. In a separate effort, five independent consulting firms divide the work of conducting risk assessments for each agency using uniform reporting formats and metrics. Sterling Associates of Olympia, Wash., acts as the lead auditing firm. Sterling oversees the other consultancies and is responsible for preparing a statewide report for each of the three phases of the risk assessment process.

In North Carolina, the state auditor's office decides which vendor will conduct each agency's IV&V process. Much of the vendor selection process is done on an ad hoc basis. As a vendor's consultants finish a project for one agency, they are free to work on a new project at another agency. "At

LEADING

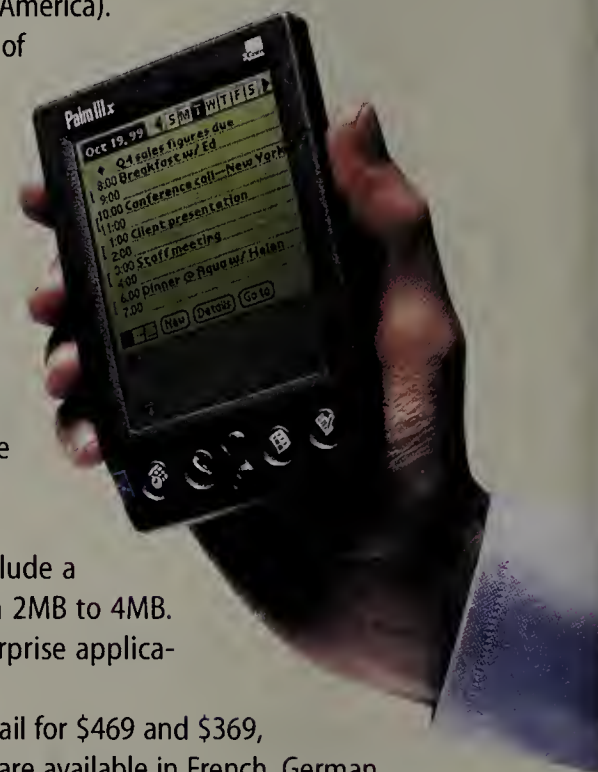
EDGE

Palm Computing Goes Industrial

NOW THAT PALM COMPUTING INC.'S HANDHELDS HAVE wormed their way into the enterprise (see "Handhelds Reach Out," *CIO* Section 1, Sept. 15, 1998), the company is doing more to serve corporate needs. The **Palm V** sports a thin industrial design and the **Palm IIIx** adds more memory and more expandability options (remember that the Pilot name is no more, thanks to a lawsuit from the Pilot Pen Corp. of America).

The Palm V is half the thickness of previous Palm computers and weighs only four ounces. For the first time, in addition to the traditional PalmOS applications, it includes connectivity to Microsoft Corp.'s Outlook. Among the improvements are a new battery that can recharge when the Palm V is in its synchronization cradle and the ability to adjust the display using a software control rather than a hardware dial. Improvements to the Palm IIIx include a doubling of its RAM capacity from 2MB to 4MB. It can now import data from enterprise applications on the corporate network.

The Palm V and the Palm IIIx retail for \$469 and \$369, respectively; international versions are available in French, German and Spanish. For more information, call 800 881-7256 or visit www.palm.com.



Speeding Up SAP

OTHER ENTERPRISE RESOURCE PLANNING SOFTWARE makers haven't had much luck in slowing down SAP's R/3. However, once you install the software on a couple hundred corporate systems, any number of glitches can bog down R/3's performance. Enter Envive Corp., a Mountain View, Calif.-based company that recently released a spate of products and updates under the heading **Collaborative Service Level Suite** (SLS). The suite provides a single console for viewing SAP applications' performance data.

SLS works hand in hand with another Envive product, Operations Datamart, to record, store and analyze information about how well (or poorly) SAP is running. The products monitor end-to-end application response time and help pinpoint whether performance hang-ups are arising from the network or in the R/3 database itself. According to the company, Envive's single view of multiple data sources increases communication among IS functions typically responsible for keeping R/3 perking along, including network and database managers, operations workers and help desk personnel—hence the "collaborative" moniker. Pricing for the suite starts at \$37,500; the data mart costs \$10,000. For more information call 650 934-4100 or visit www.envive.com.

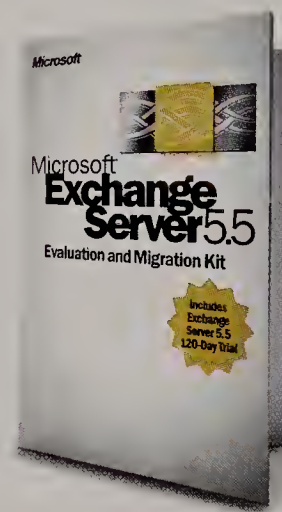
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first there were dissimilarities among vendors in methods and reporting procedures. Now that we've worked out the differences, we get some cost savings when multiple vendors with similar skill sets can bid on new IV&V projects as each agency becomes ready for its software audit," says State Auditor Ralph Campbell.

Like Campbell in North Carolina, Gary Christoph, CIO for the federal Health Care Financing Administration (HCFA), the funding agency for Medicare, recognizes the benefits of working with multiple vendors. For its massive IV&V effort—involving 50 million lines of code from 25 mission-critical systems owned and operated by HCFA and 78 mission-critical systems operated by private insurance companies for processing and paying Medicare claims—HCFA is using consultants from AverStar and two other vendors. "Each consultant brings an extra set of eyes and ears. The more perspectives we get, the more information. We now have a much better idea about which of our processes exposes us to the most risk," says Christoph.

A Learning Experience

Irene Dec, vice president of operations and systems and Y2K program manager for The Prudential Insurance Co. of America in Newark, N.J., reports "Getting the results of an IV&V report tells us what steps to take to prepare a contingency strategy for all of our facilities, other assets and our business partners." It's a small price to pay for taking extra precautions.

Steinbrecher of Contra Costa County concurs. He estimates that his county spent \$3.2 million and sustained another \$3 million in soft costs (that is, overtime, night and weekend work) on its Y2K remediation and testing efforts. By contrast, the county paid Alydaar only \$18,500 to run 125,000 lines of IDMS code from four key applications through SmartAudit and to issue an audit report. "It was money well spent," says Steinbrecher. "Alydaar's report uncovered three issues in 100,000 lines of code, all of them minor. These results reaffirmed that Team 2000 did very thorough work."

Despite Contra Costa County's clean IV&V report, Steinbrecher's team plans to be at "ground zero" (the data center in Martinez, Calif.) when the calendar flips to the new millennium. In a county that has three bridges and between three and eight oil refineries, including one that was shut down in February after a major explosion, the team wants to take every available precaution for public safety. **CIO**

Peggy King is an Oakland, Calif.-based technology writer. She can be reached at peggyking@aol.com.

LEADING

EDGE

Working from Anywhere

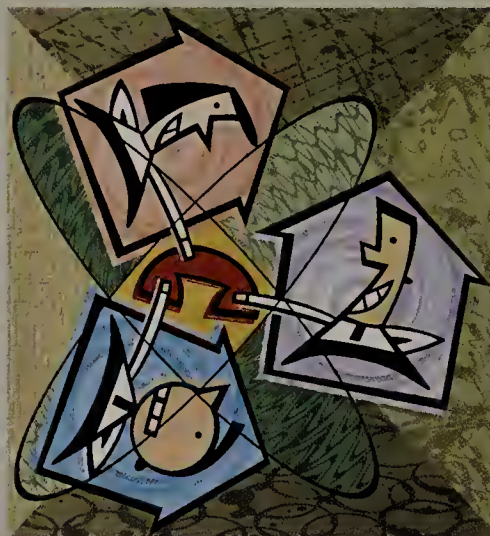
ONE WONDERFUL THING ABOUT THE WEB IS THE WAY SOME companies are using it to rethink old ways of working. Before the Web, if you wanted to work remotely with files that resided on your desktop, you needed an application like Symantec Corp.'s PAnyWhere (and your office PC had to be running around the clock so that you could access it). Now Woodside, Calif.-based Magically Inc. has created **MagicalDesk.com**, a Web service that lets you access your office files through a Web browser—whether or not the machine you're on has the applications in which those files were created. It's a workaholic's dream come true.

The fundamental pieces of MagicalDesk.com are a personal file system and a synchronization feature that ensures files and bookmarks are consistent. The service also offers a calendar, an address book and a to-do list. In addition, it includes 5MB of storage space and an e-mail account. Users upload files they'll need onto Magically's system before they leave the office. Once they access the system from their remote location, they can use the Magical Viewer, which translates more than 250 file formats into HTML code so that users can view documents, even without the application running on the machine they're using.

Basic service is free. Premium services include additional storage space (20MB for \$5 per month, 50MB for \$10 per month). The Magical Viewer costs \$5 per month, and five additional e-mail accounts cost \$10 per month. For more information, call 650 363-2489 or visit www.magicaldesk.com.

Inbound and Outbound Calling

IN THE OLD DAYS, INBOUND CALL CENTERS ANSWERED INCOMING calls, while separate outbound centers made all the outgoing calls, and never the two would meet. Now blended call centers increas-



ingly handle both types, and Davox Corp. of Westford, Mass., wants to provide the software to run the show. Davox's **Ensemble** platform manages both incoming and outgoing calls and provides computer-telephony integration and consolidated reporting tools as well as software for applications to manage agent workflow and scripting.

The system is modular in design, so customers can customize the capabilities according to their center's specific needs.

The inbound call management software runs on Windows NT; other modules require a Unix server. Davox also includes tools to integrate call centers with automatic call distribution systems and other call center hardware. Pricing has not yet been determined. For more information, call 978 952-0200 or visit www.davox.com.

ILLUSTRATION BY MARK SHAVER

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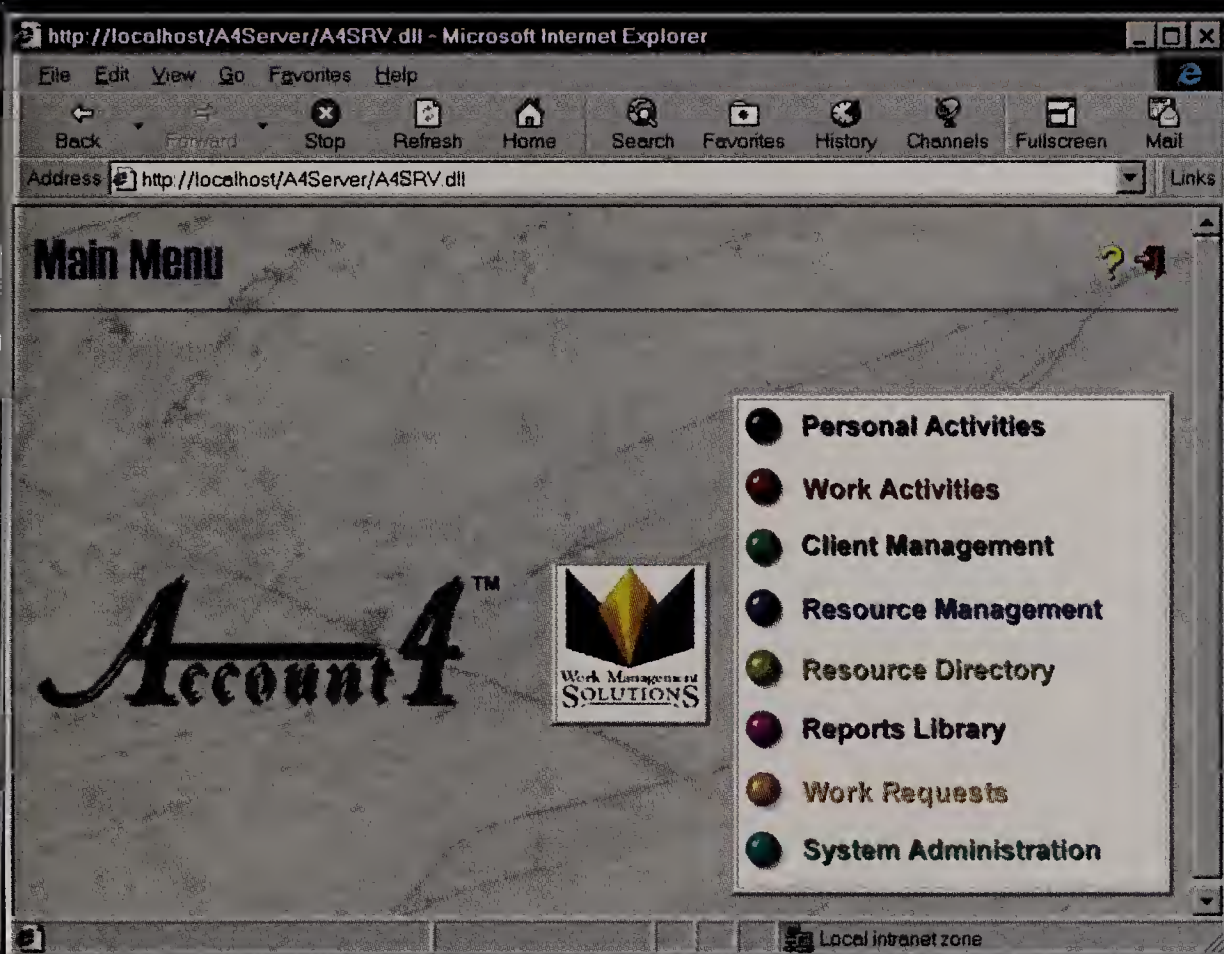
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Working Smart

MAXIMIZING THE PAYOFF FROM I.T.

IN FALL 1997, RELIANT GENERAL Insurance Services Inc. had a problem. The San Diego-based insurance wholesaler was growing, due in large part to a Jan. 1, 1997, California law mandating coverage for all drivers. As a result, Reliant's headquarters building was fast becoming too small to contain the entire staff. So Reliant stepped up a strategy it had begun more than a year before: sending employees home with everything they needed to telecommute. The only problem was the access costs. With nine employees dialing into Reliant's private network of Hewlett-Packard HP 3000 and IBM AS/400 host systems via a toll-free number, monthly modem dial-up bills came in at between \$10,000 and \$12,000 on top of the company's regular phone bill.

"Our phone bill was what it was with only nine users," recalls Cary White, Reliant's director of MIS. "If we continued with the same solution, the cost would have gone up dramatically." Dial-up technology would be prohibitively expensive if Reliant wanted to add telecommuters.

With physical space in short supply, Reliant had to find a way to support more remote employees. As luck would have it, virtual private network (VPN) technology emerged at the same time as a viable alternative to modem banks and dial-up plans (see "The Bargain Hunter's Guide to Global Networking," CIO Section 1, April 1, 1998). The cost escalation Reliant was seeing with its telecommuters isn't a factor with VPNs. Using the Internet as the network backbone, VPNs require an upfront investment in client and management software, routers and firewall technology. But costs don't rise exponentially as the number of users

Reliant's Virtual Private Network

Vital Statistics:

- **Organization:** Reliant General Insurance Services Inc., San Diego
- **Application:** Virtual private network (VPN)
- **Technologies:** VPN client/server software from Axent Technologies Inc.; firewall from WatchGuard Technologies Inc.; T1 line
- **Scope:** 20 telecommuting employees
- **Sponsor:** Cary White, director of MIS
- **Objective:** To reduce monthly network access charges for telecommuters
- **Payoff:** Reduces access expenses by 75 percent; allows inexpensive addition of new telecommuters

increase. "It made a lot of sense for us to go with a VPN," White says. "We could get rid of the [toll-free] phone line, improve performance, increase capacity and reduce costs."

In January 1998 Reliant established a permanent Internet connection for its corporate LAN, signed up with an Internet service provider (ISP) and installed a T1 line and cable modem Internet access in its telecommuters' homes. For VPN software, White chose PowerVPN from Axent Technologies Inc. of Rockville, Md., and installed it on a Windows NT server that sits behind a firewall from WatchGuard Technologies Inc. of Seattle. The standard IBM Pentium Pro desktops of telecommuters hold the client piece of the VPN.

Now when remote employees need to access policy management systems, e-mail and other job-related applications, they connect into the network through cable modems. Access to the

corporate LAN is controlled by the VPN gateway, which prompts users to enter their personal identification numbers after their client systems have requested authentication.

Today 14 employees access Reliant's host systems via the VPN full-time, with another six using the VPN after-hours or on weekends. Even with more than twice

as many users, Reliant's access bill is down about 75 percent to approximately \$3,000 per month.

While T1 line costs are high, White's convinced that going with a VPN was the right choice. Not only are response times faster for the remote employees, but Reliant currently has 25 client licenses from Axent Technologies, allowing the company to add telecommuters at a minimum cost. "The only additional costs we would incur would be for more licenses and Internet access charges," White says, adding that

Reliant is barely tapping into its T1 capacity. With underwriters connected to the network typically for five days each week, Reliant's telecommuting infrastructure will accommodate more employees. White doesn't even want to think about what his phone bill would have come to with the old dial-in method. In addition, performance over the VPN into the company's policy management systems is a lot faster and more reliable than the previous dial-up system.

"With the VPN, the biggest benefit is the costs we *don't* have to pay for adding telecommuters," he says. And telecommuters get a benefit too. Reliant picks up the costs of cable modem access from their homes.

Written by Senior Editor Megan Santosus (santosus@cio.com). Send Working Smart ideas to Features Editor Meg Mitchell at mmitchell@cio.com.

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